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[OFFICIAL NOTICE.]

Detroit Meeting, American Gas Institute.

HEADQUARTERS, AMERICAN GAS INSTITUTE,
25 West 39th street, New York, Aug. 20, 1909.

The following preliminary outline of the plans underway for the Detroit meeting of the American Gas Institute may be of interest. The Committee of Arrangements, as appointed by President Prichard, was made up as follows: Irvin Butterworth, Chairman; J. T. Lynn, J. J. Knight, B. O. Tippy, W. T. Barbour, W. S. Blauvelt.

With the approval of the President, Mr. Butterworth has added to the list a number of men prominent in the gas industry. The Sub-Committees are now arranged as follows:

Ways and Means Committee.—James T. Lynn, Chairman; W. T. Barbour, Geo. H. Barbour, James W. Dwyer, John J. Knight, Frank Hulswit, Lazard Kahn, D. J. Collins, J. N. Williamson.

Smoker.—Jules G. Hoffman, Chairman; Alonzo P. Ewing, A. L. Zwisler, F. P. Mueller, Ed. Leaky.

Boat Trip.—V. F. Dewey, Chairman; W. S. Blauvelt, Jas. Foley, Roy Shacklette.

Entertainment of Ladies.—H. L. Olds, Chairman; W. G. Henry, W. R. Vanvalkenburg, Andrew H. Green, Jr., Samuel T. Douglas, W. E. Moss, B. O. Tippy, Stanhope Boal, W. C. Kennedy, George D. Roper, George M. Clark, Charles H. Dickey, A. T. Knowlson

Hotels, Hall and Information.—E. F. Lloyd, Chairman; George Osius, Edward M. Mabcourt, G. O. Ciliax.

The Committee has decided to arrange for an informal "Smoker" at the Wayne Pavilion, instead of a banquet. There will be a theater party, luncheon at the Country Club and trips about the city for the ladies. A steamboat trip to Lake St. Clair, down the river to Bois Blanc, including an inspection of the very interesting engineering work at the new channel, and a visit to the Solvay Process plant, will be features. The headquarters will be at the Pontchartrain, and the meetings will be held at Elks' Hall, only a block distant.

Mr. R. B. Brown, Chairman of the Technical Committee, advises that about 16 papers are being prepared, and that Dr. Hyde has consented to give a lecture on "Illuminating Engineering."

There will be three good papers on commercial sujects, one on "Accounting," one on "Illuminating Engineering in Practical Applications," and a first-class technical and general programme.

The reports from the "Wrinkle Department," "Bureau of Information," and the various committees, will contain matter of unusual interest. Further details, as to hotel accommodations and papers, will be sent out soon.

A. B. BEADLE, Secretary.

[OFFICIAL NOTICE.]

Eighteenth Annual Meeting, Michigan Gas Association.

OFFICE OF THE SECRETARY,
GAS OFFICE BUILDING,
DETROIT, MICH., August 11, 1909.

To the Members of the Michigan Gas Association: All arrangements have been completed for the 18th Annual Meeting of the Michigan Gas Association, to be held aboard one of the large D. & C. boats, leaving Detroit, September 14th, at 9 A.M. The boat will comfortably accommodate 250. All reservations for staterooms must be made promptly in order to secure accommodations. The tickets, including the berth, all meals, in fact, all expenses from the time the boat leaves Detroit until its return, are $22 each; $3 extra if a stateroom is to be reserved for one person.

This ticket includes the annual dinner and all entertainment features. The following programme has been arranged:

"How We Sold Our Surplus Coke," by Mr. Glenn R. Chamberlain, Secretary, Grand Rapids (Mich.) Gas Light Company.

"Study of Firebrick," by Mr. V. F. Dewey, Engineer, Detroit City (Mich.) Gas Company.

An informal talk by Mr. H. M. Wilson, Chief Engineer of the Technologic Branch, U. S. Geological Survey, Washington, D. C., whose "talk" will be on the "Purchase of Coal."

"Retort Benches," by Mr. A. S. B. Little, Engineer, St. Louis, Mo.

"Illuminating Engineering Problems with Gas," by Mr. Norman Macbeth, Manager of Illuminating Engineering Laboratories, Welsbach Company, Gloucester, N. J.

The sessions have been so arranged that it will give you ample opportunity to see the beautiful scenery of the St. Clair river, the beautiful scenery of the St. Mary's river, and 3 or 4 hours will be reserved at the Soo for inspection of the locks. There will be 3 or 4 hours on Mackinac Island.

Staterooms may be reserved any time prior to September 1st by the deposit of $10.

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Any reservations not made prior to September 1st must be made on board the boat the morning of the 14th of September.

Circular, giving full information, may be had by applying to A. P. Ewing, Secretary, Gas Office Building, Detroit, Mich.

Very truly yours, ALONZO P. EWING,
Secretary and Treasurer.

[NOTICE.]

Experience Division, Pacific Coast Gas Association.

PACIFIC COAST GAS ASSOCIATION,
OFFICE, EDITOR OF EXPERIENCE DIVISION,
LOS ANGELES, CAL., August, 1909.

To the Members, Pacific Coast Gas Association:

"Gas Bag:" "Why is the Experience Department Like a Divorce Scandal?"
"Leaky Pipe:" "Give It Up."
'Gas Bag:" "The Experience Department relates to painful Experiences, but a divorce scandal is a painful experience to relatives."

Be that as it may, what the Experience Department hath brought together let no man tear asunder. Every year we have our sanctified, purified and illuminating union; and it is a union of affinities. Two hearts may beat as one; but no man can beat experience as a teacher. What, then, can so efficaciously teach the gas man as this wedding of Experiences, chaperoned, purified and solemnized by the Editor of the Experience Department? Preparations for the ceremony are now underway, and we need your assistance. Send in your experiences. Speed them along. Brook no delay. Almost any old thing is eligible, and no family names are betrayed. Fall in line: The wedding march is sounding. Fraternally yours, R. P. VALENTINE, Editor.

[NOTICE.]

Wrinkle Department, American Gas Institute.

WRINKLE DEPARTMENT, AMERICAN GAS INSTITUTE,
OFFICE OF EDITOR, GAS OFFICE BUILDING,
DETROIT MICH, March 12th, 1909.

To the Members, American Gas Institute: All members of the American Gas Institute are earnestly requested to forward contributions for the Wrinkle Department as soon as possible.

Your co-operation determines the success of the Department.

F. L. CROSS, Editor.

BRIEFLY TOLD.

OBITUARY NOTE, FREDERICK RILEY PERSONS.—The JOURNAL for August 9th contained brief mention of the death of Mr. Frederick Riley Persons, whose passing over occurred the morning of August 1st. Deceased was one of two sons resulting from the marriage of Jane Riley and Byron Persons, whose home at the time (January 5, 1856) was in East Aurora, N. Y. His father was well known in that section of New York during the double-decade 1850 to 1870, and saw to it that the son received an education sufficient to fit him for business life in the East Aurora Academy, which in those days was noted for the thoroughness of the tuition given to its students. His early pursuits were of a commercial sort, but a change occurred in his business career when, in 1878, he joined the forces of M. S. Frost & Son, at Akron, O., where they controlled a so-called fuel gas plant. Here deceased acquired his first practical knowledge of the gas business, and the writer has often heard "Ed." Frost say years afterwards that "Fred." proved an apt pupil. He accompanied the Frosts in their gas works' venture in Elyria, O., in 1879, and in 1880 to Omaha, Neb. By this time deceased (whose personality was of the aggressive sort) had formed a large acquaintance in the gas industry, particularly in the West; and, pliant of speech, a good *raconteur*, and of strong physicality, together with his membership in about every Gas Association that was formed, and in the affairs of which his potency for good was always manifest, he accepted the position of Western representative of the Harris-Griffin gas meter manufacturing concern, with headquarters in Chicago. In this field Mr. Persons found good scope and incentive for his talents. He went on the road in 1884 and remained to travel it up to the illness that finally proved fatal. The first symptoms of this were shown in the spring of 1907, but his vitality was of such robust order that his business activities did not cease until the winter of 1908–9. He remained with the Harris Griffin Company until 1891, when, at the instance of Mr. C. M. Higgins, he became travelling salesman for the Standard Oil Company's enriching oils department. He kept up that affiliation until 1897, when he attached himself to the sales' division of the Maryland Meter Company, with headquarters in Toledo, O. In fact, he had been a resident of Toledo for quite some time prior to this period of his history. In that service he was at the time of his death. While Mr. Persons never attained to the Pressdency of any of the Associations that he served so faithfully and well—and that was altogether through his direct connection with the apparatus branch of the business—it nevertheless can be positively stated here that no other man in the industry did more faithful or continued labor in advancing the objects of Association work than deceased. This was more especially marked in respect of attending to the details of arranging for the social side of Association gatherings—a work fraught with detail of a nature often approaching the harassing and always charged with vexation and fatigue. Mr. Persons often prepared interesting papers for the technical side of the records, and frequently (always with success) acted as special correspondent for the JOURNAL. He was united in marriage to Lucebia Labarre in 1891, who survives him, as does a younger brother. He was a Scottish Rite Mason, and was prominent in Sanford Collins Lodge, F. and A. M., No. 396. His funeral services were held in his late home, Prescott street, Toledo, the afternoon of August 4th, and many gas men travelled many miles to pay the last tribute to one whom in life they loved. Among these were James T. Lynn, of Detroit; Thos. Clive Jones, of Delaware, O.; Irvin Butterworth, of Detroit, Mich., and Carl Asendorf, of Chicago. In this short mention of the life of Mr. Persons it would not be at all unfitting for the writer to bear testimony to the fact that the ways of the deceased were largely of the order that have caused the gas industry to thrive and wax great through the acts of its lieutenants.

DUTY OF AN ELECTRIC LIGHT COMPANY AS TO WIRES NOT OWNED BY IT.—The Kentucky Court of Appeals, in a case where a person had been killed by taking hold of an electric light wire which had fallen to the street, and which was used by the defendant Company for the transmission of electricity, but not owned by the Company, reversed a verdict, which the trial court directed the jury to render in favor of the Company, one of the grounds of reversal being that the trial court had not allowed a witness to testify as to what the deceased said upon taking hold of the wire. In the course of its opinion, the court expressed the following opinion as to the duty of the Company under the circumstances: "The Company could not escape its responsibility as the dispensers through the public streets and roads, of such a stealthy, deadly force as an electric current of such high voltage upon insecure lines of wire, where the public might reasonably be expected. No more could it dispense with the duty of inspecting the wires, from time to time, to see that they were securely fastened and properly insulated, although the lines were not owned by it. When it used the lines, it was its duty to see to their proper and safe condition. This duty was not discharged by the exercise of ordinary care, but required the highest degree of care to keep them safe. If the wire broke because of the storm of Sunday morning (the injury occurred late Sunday afternoon), and the Company did not know that it was broken, and could not in the exercise of that degree of care exacted of it by the law have discovered it, then it would not be negligent in failing to discover it; but, having knowledge of the manner in which the wires were strung, the length of time they had been exposed and in use, and that the insulatiou was off much of the wire, whether then it was negligent in failing to inspect and discover the break, from whatever cause it may have occurred, for more than 12 hours in the daytime, is a question for the jury." Lewis, Administrator, *vs.* Bowling Green Gas Light Company, Court of Appeals, Kentucky, 117 S. W., Rep. 278.

CURRENT MENTION.—

WITH quite some astonishment, and with unfeigned regret, we have learned of the retirement from the active ranks of Mr. Zeuner M. Jenks, whose resignation from the service of the Woonsocket (R. I.) Gas Company became effective the 1st inst. Mr. Jenks became connected with the Company in the spring of 1874, and by attention to duty his advance was so rapid in the favor of its owners that he became its Superintendent 6 years later. His success with the Company in the decade of trouble that began in 1881, was so marked as to make him a prominent member of the New England fraternity. We are glad to note, however, that his resignation from service with the Woonsocket Company does not mean actual retirement from the business field, which he likely will re-enter during the spring of 1910.

MR. JOSEPH M. BERKLEY, Engineer of the Domestic Gas Company, Los Angeles, Cal., informs us that a delegation from that city will visit the next meeting of the American Gas Institute, expressly for the purpose of showing how much they would like to have the Institute hold its meeting for 1911 in Los Angeles. May be this seems a trifle soon, but 'tis never too early to begin.

Outdoor Advertising in Indianapolis.

The city of Indianapolis, Ind., has again been enlivened and enlightened by an outdoor exhibition of gas lighting and cooking appliances. A large booth, 16 feet by 16 feet, was furnished by the Indianapolis Gas Company, at the International Inter-denominational County Fair, which was held August 16th to 21st, inclusive, on the Physio-Medical College grounds, which are in the best residential portion of the city.

The front and sides of the booth were fitted with hinges, so as to form tables and shelves, w' en opened down, for the various appliances on display. Gas ranges, a kitchen heater and a McDougall kitchen cabinet formed a model kitchen, in which cooking demonstrations were given afternoon and evening during the week of the Fair. The waffles, cookies and other good things baked in the gas ovens, before immense crowds, sold "like hot cakes," the proceeds being donated to the fund for the "Summer Mission for Sick Children."

The Fair was promoted by the Indianapolis *Star*, and one of the principal charity organizations in the city, and this naturally produced elaborate publicity in the daily *Star*. Many ladies volunteered their services as assistants in and around the Gas Company's booth, and the Company's salesmen also attended and explained and sold the many gas appliances exhibited. Besides gas ranges and the kitchen heater, there were water heaters, gas grates, iron heaters, domestic gas irons, toasters, cake griddles, "lamp-stoves," cigar lighters, and many other domestic articles, besides soldering furnaces and appliances for industrial uses. Forty-five thousand people was the official record of the attendance, and the proceeds amounted to over $4,200. The photograph of the booth will show the outdoor advertising secured by this comparatively inexpensive means.

GAS
THE BEST AND CHEAPEST LIGHT.
"PERFECT" AND "VULCAN" GAS RANGES
Sold by THE INDIANAPOLIS GAS CO.
"OPPORTUNITY KNOCKS AT YOUR DOOR"
THE INDIANAPOLIS GAS COMPANY'S
GAS IS NOW GOT TO EVERYBODY'S
SAVE MONEY AT HOME AND IN YOUR BUSINESS
USE GAS
FOR LIGHTING, COOKING, WATER HEATING, POWER AND ALL MECHANICAL WORK
THE INDIANAPOLIS GAS CO.
COOL

The Welsbach Company also had a brilliant exhibit of Welsbach burners, globes, glassware, fixtures, mantles and other lighting accessories, and here Mr. Alexander MacNab the local Superintendent of the Welsbach Company, and his corps of assistants, were kept busy explaining the advantages and economies of their alluring wares. The grounds glowed with Welsbach gas arc lamps, loaned for the occasion by the Welsbach Company. All the gas used during the week of the Fair was donated by the Indianapolis Gas Company, the grounds, circus and other shows and "concessions" being piped by the Gas Company at net cost of labor.

Two other large kitchens were equipped with gas ranges and these cooked the dinners and suppers for the large dining tent, which was also illuminated by gas arcs, and was in charge of the ladies of various churches. The main kitchen in which two gas ranges were kept busy all the week will remain on the grounds and will supply the large demand for rolls, bread, pies, cakes, etc., for the neighborhood.

It has been decided that next year the Gas Company's booth shall be extended to accommodate several hundred people, so that cooking lectures may form one of the principal features of the County Fair of 1910. The exhibit was in charge of Mr. Philmer Eves, Sales Agent of the Indianapolis Gas Company.

Experiences with a Small Sulphate of Ammonia Plant.

[A paper read by Mr. H. W. Saville, of Drogheda, before the Irish Association of Gas Managers.]

On going through the published accounts of the Drogheda gas works immediately after taking charge of the undertaking, I found, among other things, that the production of sulphate of ammonia was far from being satisfactory. My first business was to put the plant in operation, in order to see the method of working, and, if possible, to find out where the fault lay. The plant is only a small continuous one with a still 2 feet 6 inches in diameter and 8 feet high; the steam being generated by an independent vertical boiler.

The boiler would work up to 50 pounds per square inch; but the pressure was kept intentionally low—working between 10 pounds and 20 pounds. The supply of steam to the still was regulated by a 1¼-inch wheel valve, necessitating constant attention in order to keep up anything near an equal pressure. The low temperature of the steam at the pressure at which the boiler was worked produced a very sloppy salt, of bad color, and made a large quantity of mother liquor—in fact, every available vessel was full of this liquid, and a quantity had found its way down the drains.

At the first working I found one very serious defect—viz., the draining table, instead of falling to the saturator, inclined the opposite way. On inquiry, I found that when the table was cleared the drainings were thrown out. No doubt the table was left by the makers in proper condition, but had settled in some manner and had never been observed.

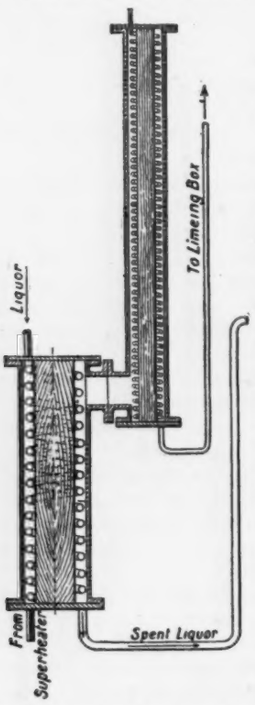
After completing the first batch of sulphate, I had all the stock cleared out, and made a careful examination of the whole plant. On taking up the boards in the sulphate store, I found that the drain into the well was completely blocked, and a few leakages in the lead floor accounted in some measure for the large quantity of acid used. After having the lead work repaired, the plant put together, and the draining table reset, I had a 1¼-inch reducing valve fixed on the steam supply, set at 15 pounds, so that at all times a constant supply of steam was assured. The steam boiler was then worked at about 40 pounds, steam pressure, which, in figures, meant that the still was receiving the steam at a temperature of 267° F., in place of 213°. The immediate result was that the salt was of a different nature and appearance, and the difficulty of the excess of mother liquor disappeared altogether. Financially, the result was that the production of sulphate was more than doubled, though a less quantity of acid was used.

I was then, to the best of my belief, getting everything out of the still for its size that it was capable of producing; but yet I was dissatisfied with the small turnover, the high labor cost per ton, and the fuel account. It seemed almost a misnomer to call it a continuous still. It was certainly not my ideal of a continuous still, which once started should need nothing but having the steam kept up and the supply of acid seen to; the liquor feed should be constant, and require no adjusting.

To commence working the plant, we had to steam for 4 hours, and it would be 14 hours before any salt was produced. Every time acid was put into the saturator, or lime into the still, the supply of liquor had to be checked until the temperature had been raised again, and at the rate at which we could turn liquor through the still, we could only make about 6 cwt. of sulphate in 24 hours.

After considering the question in all its bearings, I had a thermometer fixed on the liquor supply to the still, so as to have exact data on which to work, and had observations taken every few minutes for 12 hours. The results were very unsatisfactory; the maximum temperature being only 125° F., running down to 100° F. when liming, and to 105° F. when charging the saturator with acid. The next experiment was to take the temperature of the spent liquor leaving the still, with a result that somewhat surprised me—the temperature being from 185° to 195° F.

The natural inference was that there was more heat to be got from the waste liquor than from the superheater, if it could be utilized in any manner. The next difficulty was to overcome the drop in temperature when liming, and the only way to do this seemed to be by a constant feed of lime water. The working of the still by gravitation led me to try charging the still with lime in the same way, both having the same pressure to overcome.



Saville's Supplementary Attachment to the Drogheda Sulphate Plant.

I have now pleasure in describing the method I have adopted to overcome these difficulties, and the apparatus which is now in successful operation at the Drogheda gas works.

The apparatus is purely supplementary, and does not alter or interfere with the existing sulphate plant. It consists of two cast iron pipes, the lower one 1 foot 1 inch in internal diameter and 4 feet long; and inside this is a coil of 1½-inch steam pipe, 40 feet long. Through this coil the whole of the heated spent liquor passes. The coil is surrounded by the liquor supplying the still on its way from the (so-called) superheater. The other pipe is 7 inches in diameter and 6 feet 6 inches long. It contains a coil 80 feet long, of ½-inch steam tube. Steam is connected to the coil which enters at the top. The object of the coil is threefold:

(1) To raise the temperature of the liquor surrounding the coils to upwards of 170° F. before starting the still.

(2) To maintain this temperature so that at all times, and under all conditions, the liquor supplying the still is at an almost constant temperature.

(3) The steam and condensed water are passed forward to the elevated liming tank, where it both acts as an agitator and supplies a quantity of boiling water.

The supply of lime is continuous in quantity, and has an even temperature. In this manner, the whole of the steam used in the ½-inch steam coil is utilized and returned to the still, either in heated liquor or lime water. It will be observed that in both cases the liquor travels in the opposite direction in the chambers to both the spent liquor and the steam in the coils; so that it passes into the still at the desired temperature.

The two pipes forming the apparatus do not stand over each other. Originally, that was my intention; but on preparing a sketch, I found it would be difficult to make the connections required. As at present fixed we can easily (by taking off the flanges) get at any part of the plant, or take the coils out entirely for examination if necessary. All the joints are outside and in sight. Down through the center of each coil is inserted a wooden core; the object of this being to reduce the space—thus having a smaller volume of liquor to heat and getting to work so much quicker.

I have had thermometers fixed at various points on the plant, so that the steam on both the still and the coil can be set to a nicety. The valves never need be touched until the plant is shut down.

We now get the still in full operation after having steam turned on for 40 minutes, while we begin to fish in about 6½ hours. The quantity of liquor passed is increased by 80 per cent. There is no anxiety about liming, which, under the old pumping arrangements, was apt to be neglected.

One result of using the apparatus is that, instead of working day and night shifts, as much salt is made during the daytime now as in 24 hours before; so the night shift has been dispensed with. The plant takes so little time to get to work in the morning that the attendant can start practically where he left off the day before. In this way, one is able to give the personal supervision so necessary in small works, and which it is impossible to secure during the night.

I may here state that the quantity of steam used by the coil is infinitesimal, and the amount of steam required by the still is so much less that I am getting more than twice the return from steam as formerly—taking into account the increased flow of liquor. As a matter of fact, I have been enabled to dispense with one steam boiler entirely.

Under the foregoing conditions, in my opinion, the bulk of the free ammonia is liberated in the top and second compartments of the still, leaving the remainder of the still to deal with the fixed ammonia. The spent liquor is now practically at boiling point when leaving, which in turn loses its heat to the fresh liquor. The salt produced is both drier and better in appearance, and will bear comparison with any produced in the best of plants.

The plant described is very simple in its application, and the cost is very low. It returned its first cost in a fortnight's working.

Discussion.

The President said he had followed the paper very closely, and considered that it just bore out exactly what he himself said. It was a pity that the managers of small gas works would not adopt sulphate plant, because there was no doubt that, after a short time, it paid for itself. There was such a ready market for sulphate of ammonia that it was really a shame to see the liquor cast aside and not used. By the manufacture of sulphate they, of course, increased their revenue. It was not a very costly item, and in any case the liquor itself, if not worked, was actually a nuisance. In his own case, it was so much a nuisance that it cost them from $75 to $100 a year to cart it away outside the town. Last year they made over $200 net profit from sulphate of ammonia, and saved the other $100—a matter of $300 in all. This was, of course, a consideration. The cost of the plant did not exceed $1,500—he thought it was $1,435 altogether; so that the investment was paying very well. They were getting good interest upon their money and they had abated a nuisance as well.

Mr. R. G. Shadbolt (Grantham), in complimenting Mr. Saville on his contribution, said the effort he had made to deal with the sulphate plant in the condition in which he found it was an object lesson which all young gas managers might take to heart. He well remembered, on being placed in charge of different works, at various times, the extreme longing he had to sweep the decks, and to put in something up-to-date. If all young men were to adopt this line, as they were inclined to do, naturally, they should be able to give a better account of their stewardship. He should like Mr. Saville to give them the yield of sulphate under ordinary conditions, after he had tilted the draining table and stopped the leakages and the excess of mother liquor; and then the increased yield of sulphate after he had added to the plant the method of superheating—and regeneration, might he take it? It all really amounted to this, that he had reduced the use of steam and the waste of heat to the minimum. The successful manager, either in sulphate or gas manufacture, or any of the operations they were called upon to conduct, was not the one who could take $5.10 out of $5, but the man who reduced the waste to the utmost minimum. They could not make more out of matter than was in it; but they could reduce—and Mr. Saville had gone on these lines—the waste, which was either dissipated in the atmosphere or which was lost in the ground, to the minimum. Therein, to my mind, lay the successful manager; and if Mr. Saville would continue on these lines, he (the speaker) ventured to predict for him a career which would, at any rate, not be unsuccessful.

Mr. J. Paterson (Queenstown), said he worked a small sulphate plant—he should say somewhere about the same size as that of Mr. Saville. When he took charge of the works they had an intermittent plant, the results from which were very disappointing. They discarded this, or such portions of it as were found inadequate; and, by the introduction of a continuous still, they had materially improved the working results. While the paper was of great interest to all managers of small works who were manufacturing sulphate of ammonia, he thought it would have been of much more interest had Mr.

Saville given a few figures such as had been suggested by Mr. Shadbolt. The author told them that the results were disappointing when he took charge of the works, and that they had been very much improved; but they would have liked to have had a few figures. Perhaps Mr. Saville, when replying, would let them know the quantity of coal carbonized, the amount of sulphate made, the strength of liquor which he employed, the fuel used per ton of coal carbonized and per ton of sulphate produced, also the quantity of acid used per ton of salt made. He was rather surprised, not so much at a reference in Mr. Saville's paper, but in the address of the President, which was not open to discussion, though he would like to make a remark upon it. The President told them the fact that the results were very much improved by the reduction of the pressure on the still; but he did not give them the pressure on the still when he started work.

The President—We started with 15 pounds.

Mr. Paterson—And there was considerable improvement when it was brought down to 6 pounds. Strange to say, his experience had been the very opposite. He started with 5 pounds on the still, and the result was somewhat similar to what Mr. Saville found, when he went to Drogheda, by increasing the pressure on the still. He (Mr. Paterson) might mention that he had two separate stills—one for the elimination of the free ammonia, the bottom part of which was the liming chamber. The overflow from this still gravitated into the fixed still. All the steam, with the exception of a little, was introduced into the fixed ammonia still. On this still he had to carry 15 pounds pressure to get anything like good salt and to maintain the temperature necessary in the saturator. He had not two separate gauges—one for the fixed and the other for the free ammonia still. All the steam was admitted through the fixed ammonia still, and the gases flowing from this passed up through the free still. He would like to know what distinction there was between Mr. Saville's steam boilers and the sulphate plant. Were they far removed? He himself had some trouble in this connection. His steam boiler was fixed up in the retort house, about 150 feet from the sulphate plant; so that he lost a considerable amount of heat. The temperature was very much reduced by the time it arrived at the sulphate plant. He carried between 45 and 50 pounds of steam on the boiler.

Mr. R. Bruce Anderson (London), regarding the remark which Mr. Saville made about draining in the wrong direction, said that the very first time he went over to Ireland was about a sulphate plant with which there was some difficulty. The defect he found out was that the off-take, instead of draining away from the saturator was draining back to it. Nobody looking into the sulphate house would have seen that the pipe was draining in this direction, but would have thought it was away from the saturator. It was merely an optical illusion. The mechanic who put it up no doubt thought he had drained it away, but, as a matter of fact, he had drained it back to the saturator. The mere introduction of liquor into this pipe solved the whole difficulty. The idea Mr. Saville had suggested, of working the lime into the still by gravitation, was, he thought, a very useful discovery on his part. They had either to have a very small pump, or a large pump working at long intervals. The wear and tear on the lime pump was of considerable amount, and if the lime could be successfully run in by gravitation, it would affect the item of wear and tear, which was well worth consideration. As to the size of works sulphate plant could be profitably introduced into, he had very great doubts whether it was worth fitting up plant in works producing under 5 million cubic feet; and even then they would find that the wear and tear hardly warranted its introduction. The President talked of his plant having cost $1,500 and having had it in use for 3 years. Already, he understood, he had had to renew part of his superheater. He saw a number of Dellwik plants that had gone out of use, which either were not worth repairing, or the men in charge did not know what to do. Sulphate plants were liable to get out of order. They had no use for them for perhaps 3 months out of the 12, and what, with expansion and contraction, the wear and tear was very considerable. With regard to steam, he should say that the higher the temperature they could get steam the better.

Mr. W. E. Young (Tipperary) pointed out that Mr. Saville had not stated which way he admitted steam to the saturator. In his experience of sulphate of ammonia making, he lifted the carboy over the tank and simply emptied in the contents. He was talking to a manager recently who had adopted the steam method, but had to give it up. This manager asked him if he could recommend any good way of getting the sulphuric acid into the overhead tank. He understood how the President did it, but he wanted to know how Mr. Saville did it. Did it make a difference in the strength?

The President—No, it does not; there is no steam wasted with the injector to interfere with the strength of the sulphuric acid.

Mr. T. Frizelle (Holywood) thought it would not be difficult to get the sulphuric acid a few degrees stronger from the makers. He had got acid stronger before now, with very good results.

Mr. Saville, in closing the discussion, said that one speaker had asked why figures were not given as to certain things. It was difficult for him to give figures, for the simple reason that he worked the liquor of two other works as well as his own, and he had great difficulty, therefore, in getting at the production per ton. So far as he could make out, when he went to Drogheda, the make of sulphate was about 12 pounds per ton of coal used. After he put the draining table right, he was getting about 25 pounds of sulphate per ton, which, he considered, with the plant he had, was pretty fair. He had not had a full year of the latest arrangement, but he thought that he was now getting well on to 30 pounds. As a matter of fact, he had already, since March, made more sulphate than they did in the 12 months before he went there. He thanked Mr. Shadbolt for his kind remarks. His own liquor he worked about 5° Twaddel. If he worked up to 7½°, he found that he was losing a certain amount of ammonia, and so he kept down to 5°, and practically got all there was out of it. He was rather surprised at the remark about the increase of steam, because he found that, unless he increased the steam very carefully, he got the saturator full of mother liquor. As a matter of fact, he was working with about 2 pounds of steam in the still. So far as he could get at it, the quantity of acid used was about 2,000 pounds per ton of sulphate, which was a good return. He found that the steam, in working through the coil, was not sufficient to agitate the liquor, and he had to put a little extra steam into it. They would note that he said he got up the heat of the liquor, before entering the still, to 170°. He did heat it up to over 200°, but he found he was evaporating all the liquor, and that there was nothing in the top chamber of the still to seal it. So he found that he could not get any good returns over 170° on the coil. As a matter of fact, he could boil it out. Therefore, he put a little steam in, so as to keep the lime in a milky condition. The still was only 8 feet from the steam boiler. The different parts of the plant were all closely allied the one to the other. He had no injector for the acid. In the works he was in before, he had the experience Mr. Paterson had had—the acid was so much weakened that he had to keep putting fresh acid from carboys into the saturator to keep it up to working strength. He decided that he would never use an injector again. Of course, an injector, if it did not weaken the acid, was the best way; but he had to take the acid of the strength he could get it. He thanked the members for their kind attention. There were a lot of experiments included in the paper which would not interest them. He had many failures before he got success, and the paper he had laid before them was more or less the outcome of these failures.

Advertising Gas Illuminating Business.

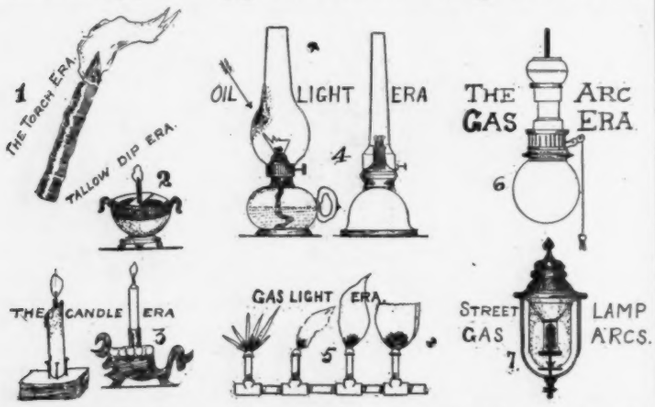
[Communicated by INSPECTOR.]

This is an era of advertising in the gas and electric lighting business. It is getting to be almost a fad for lighting engineers to arrange dates for lighting tests to which the public is invited, and it is not uncommon to see display advertisements in the press announcing that upon such-and-such a date there will be a demonstration in such-and-such a park, or such-and-such a building, of the illuminating powers of certain lights. At differing times it is gas, gasoline, kerosene, electricity or other lighting features that are to be exhibited. Again, it is the new style lamp or electrical fixture; sometimes it is a new method of light distribution for interior or exterior lighting service. At any rate, it is getting to be the practice for individuals and corporations to go into the advertising of lighting possibilities with the determination of expending money and time with a view of letting the public know that better lights or fixtures are available. Experiments are carried out with lights in full view of the public, and city officials are invited to witness the tests of public street lamps. Housewives are presented with cards of invitation to visit certain places to observe how well gas or other substance can be utilized by modern forces and devices in heating, lighting, cooking, etc.

In the exposition of the new lighting and heating operations, various factors are considered. Sometimes the advertising is done entirely by circulars distributed about the houses or stores, or the post office aids in carrying printed matter through the delivery system. Further, we

notice local and industrial press advertising. In some cases men are engaged to travel about the country with stereopticon outfits for the purpose of giving illustrated lectures on the subject of lighting. In this article will be noticed one of the methods of advertising that involves the exhibition of antique articles for purpose of comparison. Advertisers of modern apparatus find it very profitable to introduce the "new" and the "old" way side-by-side in a demonstration. For illustration, in a certain system of lighting for advertising purposes, one of the most approved gas arc lamps was shown in full force beside one of the old-fashioned, fan-shaped flames. A card announced that both lamps were using practically the same quantity of gas, although the light from one far exceeded the light from the other. This proved to be quite an advertisement for the new form of gas arc. The dealer reported that his forces of workmen were constantly busy installing the improved system of lighting, and he attributed the success of the light as being partly due to the exhibition of the light where the public could see, for a public demonstration has a far more telling effect than many other methods used for installing new types of light, as all know.

It is suggested that a show window be fitted up with the samples of lighting facilities of the different eras, from the hand torch, Fig. 1, to the gas arc of modern model in Fig. 7. The torch in the former may be of wood or rolled paper, saturated with oil, or fixed as in olden times for lighting purposes. You can now get a cement stick from any of the cement manufacturers who turn out cement logs for fireplaces, in which the cement branch will look very like the natural wood, showing knots, bark, etc. The cement torch can be set up and fitted with a pipe to carry gas from a main and the gas can be burned



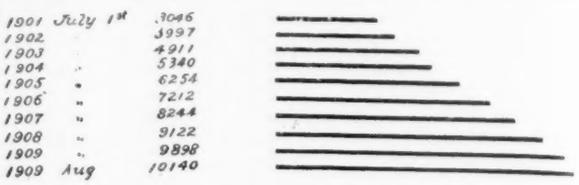
to represent the flame. This should be marked with a card as the "Torch Era." The tallow dip era may follow, as in Fig. 2. The best way to get the real article is to go to some of the junk shops or dealers in old furniture. The second-hand dealers in household goods almost always carry some old tallow dip utensils. If not, you can readily get a metal outfit constructed at the tinner's. The card will bear the title "Tallow Dip Era," and will denote one step forward in the progress of lighting. Next comes the regulation candle, fitted to a common block of wood, in which you have driven some nails, and should be placed in view in the candle era lot. It might be well to show a fancy metal candlestick, as in Fig. 3, in unison with the wooden stick. Hence we have the "Candle Era" sign. Then will come the sign carrying the words "Oil Light Era," as in Fig. 4, and some lamps may be shown. One of the lamps with a poorly cut wick and smoked glass globe adds to the interest. This combination is given in Fig. 4. In Fig. 5 is shown the "Gas Light Era," representing poor, weak, broken and full fan shaped flames. The people are always attracted by examples of imperfect and perfect lighting by gas.

Sometimes a card is placed in the window explaining just why the gas jet is broken and gives poor results. Finally, the gas arc era is exhibited, with model lamps, as in Fig. 6 or Fig. 7. These lamps are fitted up in the exhibition window and the public is interested. The interior arc light is arranged in one side of the window where its usefulness is demonstrated by the light it casts about the surroundings. The lamp arc for street lighting may be on a regular post, and if the other side of the window is used, some exterior painted scenery can be employed, representing a park or other picture.

THE distribution system of the Dover, Rockaway and Port Oram Gas Company, of Dover, N. J., is to be extended to the outlying district of Wharton. This will mean, as we take it, the placing of a high pressure line.

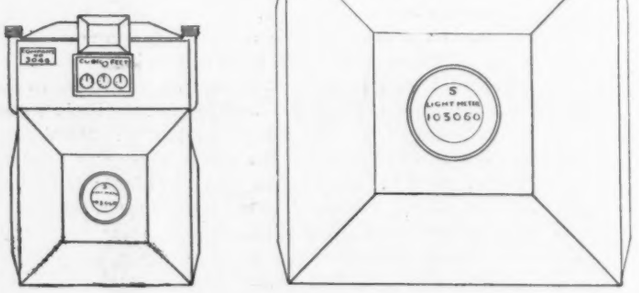
Ten Thousand Meters in Line.

A very interesting little dinner was given by the officers of the New York and Richmond Gas Company, Staten Island, N. Y., at the habitat of one of the local food dispensers, Thursday evening, August 26, to a representative body of employees, in honor of the passing of the ten thousand mark in the number of consumers. The diagram no doubt



These meters are drawn to scale and show graphically the number of meters in use July, 1901, and 10,000 meters.

The scale above shows this growth yearly.



will prove an interesting study. By-the-way, the diagram appropriately formed part of the *menu carte*.

Mr. Horton, acting as Toastmaster in his usual suave manner, the various officers responded, each along his particular line, as well as some of the heads of departments. The occasion was a general good time for all hands, the decorations being appropriate for the occasion, having on display the first meter set under the new regime and also meter No. 10,000.

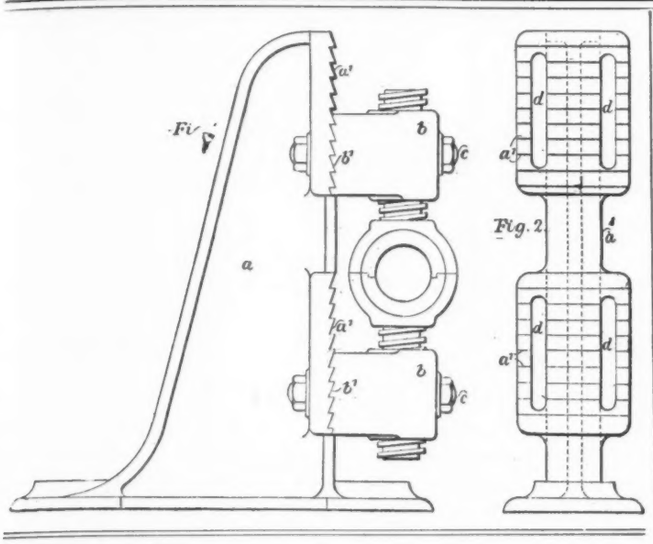
All voted it a rousing success after toasting the following:

"We've got ten thousand meters,
We'll soon have ten thousand more;
We'll make 'em thicker'n 'skeeters
On this bloomin' Richmond shore."

The Richardson Adjustable Hanger for Shafting.

Mr. R. J. Richardson, of Birmingham, England, is putting on the market a build of shaft-hanger that is finding great favor in England. The device, as herewith illustrated, is designed to facilitate the removal of the bearings for examination or repair, without any danger of the shaft being interfered with, and also for a considerable range of adjustment. It will be seen that separate horns or bearing brackets are provided which carry the shafting, and these brackets are capable of removal from the hanger. The brackets can also be adjusted to any position with relation to each other or to the hanger, so as to enable the shaft to be kept in alignment. Fig. 1 shows a side elevation of a hanger or bracket with the horns or bearers in position, while Fig. 2 is a front elevation of the bracket with the horns removed, allowing the face of the bracket to be seen.

It will be noticed that the face of the bracket a is divided into two postions a^1, which are serrated, and the teeth of these serrated parts can engage with similar teeth b^1 on the horns b, the latter being held in place by bolts. The serrations in the upper and the lower faces of the bracket are cut in opposite directions, as shown. By this device the horns can be readily adjusted in an up-and-down direction with regard to the shafting, fine adjustments being made by means of the



screws supporting the bearing. Figs. 3 and 4 are two perspective

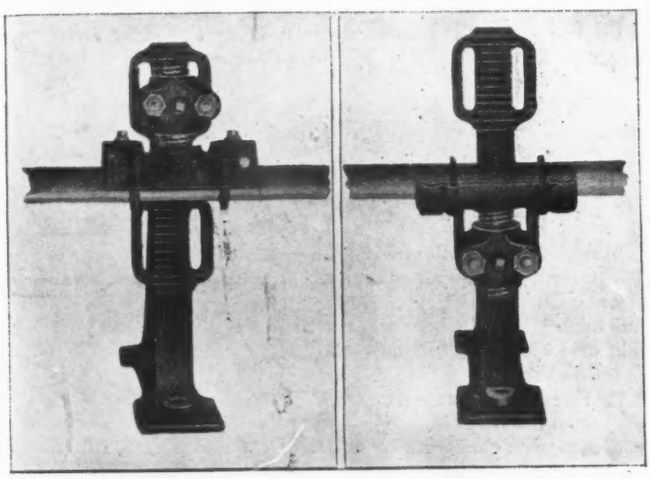


Fig. 3. *Fig. 4.*

views of a hanger of this kind, reproduced from photographs. In Fig. 3 the bottom horn and bearing have been removed, and in Fig. 4 the upper horn and bearing have been taken off. The arrangement is, however, so very clearly shown in the pictures that its main points will be easily comprehended.

Natural Gas.

In a paper read by Mr. Lee B. Mettler, Manager of the Pittsburgh (Kas.) Water Heating Company, at the recent convention of the Kansas Association of Master Plumbers, the author said:

Fredonia, N. Y., has the distinction of being the first place in the United States where natural gas was used to illuminate buildings, and although it was thus utilized in 1821, the use of this most desirable commodity did not spread to the surrounding country until many years later. It is said gas was first discovered in Canadaway Creek by Indians, the discovery being originally made at a very early day by the burning of driftwood lying on the surface of the creek.

Natural gas was, it is stated, first used for manufacturing purposes in West Virginia, where it was extensively burned in kettles for boiling salt as early as 1841, and as early as the beginning of the oil development on Oil Creek in 1859 the gas escaping from the wells was utilized for firing boilers as well as for lighting and heating on leases.

Some Natural Gas Statistics.—In 1872 it was first used for domestic purposes, a small line having been laid down from the Newton well to Titusville, Pa., a distance of about 5 miles. After 1872 the growth of the use of natural gas was not very rapid until about 10 years later, when its rapid development is noted as follows: In 1882 the value of the product was estimated at $215,000, Pennsylvania leading with $75,000 worth. The report made by the United States Geological Survey, under the direction of David P. Day, states that during the year 1906 the gas pumped from the south mains was 388,842,562,000 cubic feet, this being the first effort made to ascertain definitely the quantity of gas produced in a given year. The value of this product was $46,873,932.20, which was an increase of $5,000,000 over the product of 1905. There were 2,139 gas companies operating in 1905 and only 1,871 in 1906, some having failed and gone out of business and some having been absorbed by other companies. The increase in distance to which gas is transported tends to consolidate companies. The largest quantity in number of cubic feet was produced in Pennsylvania and amounted to 138,161,385 cubic feet.

Pressure of Kansas Natural Gas.—There were nearly twice as many domestic and industrial consumers supplied with gas in Kansas in 1907 as in 1906. Two companies alone serve a population of 850,000. Considerably more of the gas produced in Kansas is used for industrial than for domestic purposes. There were completed in 1907 a total of 361 gas wells, some of very large volume and pressure. Sealy L. Brown, gas inspector, Montgomery county, states that the largest well drilled in Montgomery county in 1907 had a rock pressure of 325 pounds and a volume of 29,400,000 cubic feet per day. The men who have given their lives to the throttling of an enormous pressure of this kind, piping it to the various homes so that the entire community are now blessed with a supply of natural gas fuel, should be given more credit than the average citizen or plumber gives them. The average plumber, and I speak from experience, finds it a pretty hard thing to make the average pipe line tight when there is only 40 pounds of hydraulic pressure on it. It is a fact that the most of us here would not know what to do with 325 pound pressure on a water pipe if we found it, unless it was to get away from the pressure gauge as fast as possible.

One reason for a low gas pressure in the winter which has been proved is that a high northwestern wind will reduce the pressure of natural gas at the wells at least 25 per cent. It is one of the laws of gas at which even the geologist shakes his head and can give no reason. Regardless of the temperature, if this wind continues for a period of 24 hours, you will find that the gas pressure is about one-fourth of what it is normally.

Gas in this State comes from a sandstone that has been found to be both extremely hard and loose. The strata of gas lies in most cases above a strata of salt water which is bedded on the Mississippi lime-rock. At Wichita the rock is found at a depth of 1,600 feet. The thicker the gas sand above it the greater the gas pressure. The origin of natural gas which seems to be confined in the pores of the rock is much the same as crude oil and coal.

House Piping for Natural Gas.—I believe that the plumbers of this State would be doing their customers a signal service if they would insist upon having the very best man obtainable to pipe residences for gas. The use of rubber tubes for connecting stoves is practically prohibited and should be replaced with proper and sensible pipe connections. I am confident that every practical gas man in this State will bear me out in this statement. You should have ordinances passed in the various cities and towns that you come from providing against hose connections. Plumbers should not take jobs of connecting up an automatic water heater where the printed directions specifically state that the gas connections to that heater shall be 1¼ inch and use a ¾-inch pipe and expect that heater to give satisfaction. The plumbers should encourage the proper installation of any gas appliance.

I believe that if the master plumbers of this State would follow out the following sample rules that your customers would not have any trouble whatever:

1. The layout of the pipe system to be arranged in ample and proportionate sizes according to the table of sizes of gas pipes for lamps, gas logs, gas cooking ranges and water heaters, as per the rules of the gas company.

2. All gas pipes to be run to fixture outlets as direct as possible, care being taken to give the pipes the proper fall, so it will give proper drainage to the riser lines. No depressions to exist in the running lines. All accumulation of condensation to be avoided. Drip pipes or emptying siphons to be put in wherever needed.

3. Never run a riser in any building less than ¾ inch. Always use care in placing the riser as near the interior of the building as possible so as to be protected against cold.

4. All large risers on distributing lines to be kept exposed where-

ever possible, or arranged so that they can be reached when repairs or additions become necessary without entailing damage to walls or floors. Smaller gas pipes, when concealed, to be first inspected and tested. All concealed pipes in floors to be rendered accessible by boards secured by brass screws. All side outlets to be fed by risers rather than drop pipes where it is possible to do so.

5. All long horizontal runs of piping to be firmly supported.

Members should use the utmost care to procure full weight soft steel or welded wrought iron pipe, and the fittings under 2 inches should be extra heavy, beaded, malleable iron. Fittings should be plain, galvanized or non-corrosive, and care should be taken in making long screw joints to put red and white lead mixed (or preferably graphite) on the outside of the threads; never on the inside of the fittings. This acts merely as a lubricant to screw the joints up tight. An ordinance that required every job of gas piping to stand a 10-pound test for 2 hours before gas could be turned on would prevent incompetent handy men from doing this class of work.

The gas companies in most of the cities throughout Kansas that are blessed with natural gas have left the sale of appliances to the hardware men and the plumbers, whereas in the artificial gas territory the gas companies generally do this kind of work. How long will gas piping and the sale of gas appliances, which make the consumption of gas possible, be held by the plumbing trade? My observation is that the plumbers will control it just as long as they continue to push the sales. I believe, gentlemen, that you should control every bit of the gas pipe that is put in a house, and that you should use the best material and labor possible. As long as you do this and continue to push the sale of gas appliances you will continue to do this work. The old "pipe a house for gas for nothing" policy which was in vogue just a few years ago, will, in a short time be eliminated if all of you convince your customers that they ought to have better work done, and that they ought to be willing to pay for that kind of work.

Troubles of a Trouble Man.[1]

By Mr. A. A. Andrews.

Not all the troubles of a trouble man happen to himself. They happen to his friends, to the men he meets in the various shops and around the hotels waiting for trains. For, be it known, a gas engine man can no more sit around a hotel, or spend an hour or so riding in a train, or go to a park in the evening, without letting it be known in some way or other to the casual acquaintances he makes that he is full of gas engine fever. You who are gas engine enthusiasts—notice I did not say "experts"—will admit the truth of this. You who are not gas engine admirers—and I suppose there are none such who are regular readers of this paper—have perhaps noticed the truth of the statement that a gas engine man proclaims himself as such in a few minutes to all acquaintances.

And so, in the course of many a picked-up conversation, the trouble man meets many men of various classes. Perhaps one is a steam engine man who has never a good word to say about a gas engine—though when you say something about that Gary, Indiana or Lackawanna gas engine plant, it makes him squirm. Or, perhaps your acquaintance is a machinist who repairs an engine now and then, or whose wife's cousin's husband once saw a gas engine on a flat bottom boat. Or, perhaps he is a chauffeur or owns a motor boat. At any rate, high or low in life's station, you don't have to go so far nowadays as you used to to rub up against a man who has heard of a gas engine. It used to be, when you said you worked on gas engines that the answer was: "Gas engine, what's that? Where you get all your windy talk from?" But nowadays, as I say, he's from a long distance or a mighty small place if he's never heard of a gas engine in some form, and naturally it makes it more pleasant and comfortable for a trouble man who feels like the day has been ill spent that he has not had a chance to talk over some old experiences, or listen to some of the other fellow.

Homer was the mill owner's son, and lived not far from the Michigan town of the same name. The mill was not so large as some of those huge affairs you see in the Northwest, and the steam engine cost so much for power that Homer's father thought he would buy a gasoline engine to run the mill. Homer had finished the country schools and had a fair education for boys in that region, and, like many boys, had a knack with machinery that spoke well for a boy whose business undoubtedly would be in connection with a flour mill where a good deal of machinery is used and where, as millers will tell you, a man must keep his wits about him to see that the flour always comes out clear and white and the same color and grade, even though some months you have good wheat to mill and others you have poor grades. When the engine was sold, the salesman made a special point that he would be glad to run over and help teach Homer how to run the engine and take care of it. He anticipated no trouble himself, as he had formerly been a school teacher and prided himself on the fact that he knew a good boy when he saw one, and also on his own skill—oft demonstrated in an algebra recitation—of getting into boys' heads the knowledge they had ofttimes tried in vain by themselves to acquire. "Surely a gas engine is no more difficult to teach a boy than the binomial theorem," said the salesman to himself when he first started out to sell gas engines. And he had made good.

And so it came about that Homer was running the gas engine. And he was proud to know that this machine was under his own especial care, that the whole mill was now dependent on his ability to care for the engine. To be sure, he did not have to spend more than an hour or so a day in the engine room, although as a matter of fact he often spent more time than was necessary. For he liked to keep her cleaned and shiny, the brass parts polished, the governor springs clean and free from dirt, which might keep them from acting on the engine properly. Everyone knows that flour mill machinery must run evenly and smoothly to produce a finished and regular grade of flour, and the miller was apt to say things if the engine shut down as it did the first day or so before Homer got onto how to keep the gasoline tank supplied with gasoline, and such little things as that which one was perhaps inclined to think of no importance at first.

But one day the engine failed utterly. It simply shut down when Homer was in another part of the mill and—though he ran as fast as he could when the machinery began to slow down—the mill was stopped before he got to the engine room and he was unable to get it to run for more than a few turns at a time. It did seem too bad, but the more he tried to start the engine up the worse it seemed to get, and he finally had to give up in despair, and, had not the boys in the mill been looking at him he would certainly have sat down and cried, so disheartened and disappointed was he.

There seemed to be no help for it, a telephone call was made for the school teacher salesman who lived in a neighboring town and who came over the following morning. He had in mind the binomial theorem and his school teaching days and so he refused to touch the engine until Homer tried to start it.

"You see, Mr. Kane," said the boy, "I have always tried to start it just as you told me and have had very little trouble. First, I always work the pump to get gasoline up, see that the battery switch is in, put in a priming charge, bring her back on the compression and operate the igniter just like that. But she don't go. She always did before."

"Well, Homer, what do you think is the trouble with it?"

"Now, see here, Mr. Kane," said the miller, "We've been shut down since yesterday morning. Why don't you go and start her if you can do it? We can't sit around here waiting for all that fooling. I don't believe you can start her yourself."

"Well, perhaps not," said Mr. Kane, "but if I find this trouble myself, how is Homer going to find the next trouble? Now that I'm here, I am going to teach him how to find the trouble himself. Now, Homer, what do you think is the trouble?"

"I don't know."

"Suppose there was not another gas engine man in the country and you had to get that engine going, just simply had to get her running. What makes her run?"

"Gasoline."

"Sure. Have you got it?"

"Yes. I thought of that first thing, because one day we were shut down a day waiting for you because the gasoline tank got empty. We filled the tank up yesterday after the engine shut down."

"Yes, I know that," said the school teacher, "but I noticed when you put in that priming charge the engine fired all right for one shot and then shut down. That looks as though the ignition and compression were all right for one shot. Why don't it shoot again? If you kept squirting gasoline in there with the priming charge method, wouldn't it go? That's all your gasoline pump and mixer is for—just to keep squirting gasoline in the cylinder. You've got gasoline in the tank. That doesn't help you unless you get it into to the engine. Do you? Let's see."

1. "The Gas Engine."

"Well, I worked the pump all right, Mr. Kane, and you can see here that the gasoline flows back through the overflow pipe, so it surely gets to the engine."

"Homer, I'm almost ashamed of you. You're a bright young chap. Now suppose, you were hungry and I took you down to the hotel and put you in a chair and tied your arms back of you and then had the food put on the table. Would that help your hunger? Now that engine has got to have gasoline in its mouth. It doesn't help much just to bring the gasoline to the table, unless you get it into the cylinder. The trouble is you stopped too soon. Gasoline comes to the mixer, does it? Does it get into the cylinder? Now here is a little tube where the gasoline goes into the cylinder when the suction of the piston tends to create a vacuum in the cylinder and sucks the gasoline through this. See that little thread in that tube? Pull it out, and I'll venture the engine will start the first time you try her."

Homer, somewhat abashed, did as he was told, and made up his mind that he would find where that string came from. It looked like a piece of waste and he recalled the fact that he had always been particular when wiping up the engine not to get any of the waste caught in any of the working parts of the engine for fear it might cause trouble. In fact he had many times used rags instead of waste on the igniter and governor. Besides that, how could waste on the outside of the engine get into that gasoline tube? The school teacher's process of reasoning led him to believe that that waste must have gotten there some way, even though it seemed impossible that he could have let it get there. If he did not get it there, someone else did. There was no one else around the mill who was supposed to have anything to do with the engine. The second miller had wanted to have charge of it, because he had to take care of most of the other machinery, and Homer knew there was something said when the second miller thought the mill owner's son was being pushed over him by being put in the engine room. The second miller had to go into the engine room occasionally for his supply of waste and oils for oiling the machinery, and to Homer it seemed almost clear that the second miller had deliberately put that waste string in there. How to know the truth was what worried him. Nothing could be done for the present, however, but to watch and not get caught again.

As for the engine, it seemed to go along as though it cared nothing about strings or millers or engineers. For a week or so everything ran smoothly and Homer had almost forgotten about his experience, except that he still regarded the second miller with suspicion. The fact that the second miller had given notice he would quit at the end of the month did not add to Homer's feelings, especially as some of the boys told him the young fellow had said he would "get Homer before he left."

As a precaution, Homer was now getting to the mill about half hour before starting time; "so's to give me time to fix her up if anything should happen," he said to himself. On the last day of the month he felt, with relief that the second miller had failed to "get him," and would be gone to-morrow and he was then going to leave town. Homer was a little later than had been his custom recently on the following day, and as he came up to the mill he saw the second miller leaving, taking his kit and working clothes with him. Hurrying in to start the engine, everything seemed all right, and when the priming charge let go he felt relieved. In fact the engine started off all right, but after a few turns seemed to die down with spasmodic firing. The gasoline tube was Homer's first thought, but when he found it all right he muttered "too smart for that, of course."

The calm demeanor of the school teacher occurred to Homer, as he recalled how complacently Mr. Kane had fooled away the minutes showing him how to locate the trouble. "Now, Homer, what do you think in the trouble? What makes her go?" Mr. Kane had asked.

Homer thought the gasoline made the engine go and thought this was not the trouble, but he tried the pump, watched the overflow, spent a few minutes on the mixer, all the time subconsciously thinking that the second miller was too smart to "monkey" with the gasoline this time. "What else makes her go?" thought the boy. The compression. But that seemed all right, or at least the charges ought to fire, anyway. So he tried small priming charges and large ones and the ones he had previously found by experience to be too rich did not fire and, on the other hand, the weak ones would not fire either. The ones about the usual size sometimes fired and sometimes they didn't. "Try the igniter. Seems to work all right. Does she spark?" The boy was talking to himself.

"That spark seems kind of weak, still it sparks. The battery seems all right," as he tested the cells with a couple of short pieces of wire. "I'll run a new wire from the battery to the engine. Maybe he's done something to that wire," seemed at least to offer a suggestion.

When the new wire was connected, the engine ran off all right. And just to satisfy himself Homer took that old wire down very carefully and finally, with a grunt of satisfaction, found a place under one of the staples where the wires were scraped clean so that when the staple was driven in tight it short-circuited the current. The engine would fire a little, Homer found, with the wires in this condition, but it accounted for the spasmodic firing he had experienced.

"Anyway," said Homer, with some pride, "the mill started on time."

"Teaching fits a man for a good many things sometimes," was Mr. Kane's remark when he read Homer's letter telling about his experience.

[Continued from Page 579.]

The Comparative Values of Various Coatings and Coverings for the Prevention of Soil and Electrolytic Corrosion of Iron Pipe.

[A paper prepared by MR. ROBERT B. HARPER, for the Illinois Gas Association.]

THE DESCRIPTION OF ELECTROLYSIS TEST SAMPLES.

As has already been stated, the electrolysis samples were coated pipe, about 27 inches long and 1¼ inches internal diameter. Pipe such as that used in the electrolysis test is sometimes referred to as steel pipe, owing to the fact that scrap steel is used in its manufacture. However, the test sample pipes resembled wrought iron pipe as regards the general fibrous structure.

All pipe samples were carefully cleaned by a wire brush to remove rust and non-adherent scale. Grease, oil, or other foreign organic matter was removed from each test pipe, prior to coating the same, by the use of some suitable solvent, heat, or other means. In most cases the test pieces were not pickled in acid, but covered with protective coatings after thorough treatment to remove all rust, loose foreign matter, and any trace of moisture. Each sample received the utmost care in the application of the coating material, so that any possible failure of the covering could not be attributed to apparent defects of application. The amount of materials used in each coating was carefully recorded and a determination made of the average thickness of individual coverings. So far as was possible, each coating was allowed to cover the pipe to a thickness governed mainly by the consistency, adhesiveness and other natural properties of the protective material. In general, the paints or dips were applied so that all useless excess was reduced to a minimum. Each pipe was covered in such a manner that, to the naked eye, each type of coating appeared as perfect as it was possible to make it. Great care was exercised in handling covered samples, so that no abrasions of the protective films or wrappings might take place before covering with a soil in a test box. In nearly every case, two numbered sample pipes were covered in an exactly similar manner with any given coating or corrosion preventative. The odd, or lower, numbered test pipe was placed in the box containing clay soil, while the even, or higher, numbered test pipe was subjected to the action of cinder soil in the second box. All pipes will be hereafter usually referred to by their respective numbers. The detailed description of the test samples is as follows:

Sample pipes Nos. 1 and 2 were painted by brush with two medium coats of carbonkote. The first coats were allowed to dry for 18 hours before the second coats were applied. These pipes, after drying 3 weeks, presented a dull, semi-glossy appearance and seemed to have a firm, hard, covering not easily scratched off. This carbonkote was applied on the samples at a rate of 1 gallon per 260 square feet for each coat, or 1 gallon for each 130 square feet of finished pipe.

Sample pipes Nos. 3 and 4 were first coated with a medium coat of carbonkote. After the first application of paint, by means of a brush, the samples were tightly wound with a single strip of cloth, 4 inches wide, to give an average of two thicknesses over the pipe. Upon the completion of the wrapping process, the cloth bound pipe was again painted by means of a brush with carbonkote until the cloth covering was saturated. One gallon of carbonkote was required for every 55 square feet of finished pipe.

Sample pipes Nos. 5 and 6 were painted, by brush, with a medium coat of carbonkote, and then wrapped with a single strip of medium tar paper, 4 inches wide, overlapping 1 inch. Upon the tar paper a second coat of carbonkote was applied by means of a brush. This

method of covering pipe requires 1 gallon of carbonkote for every 120 square feet of finished pipe.

Sample pipes Nos. 7 and 8 were painted, by brush, with two medium coats of crysolite. The first coats were allowed to dry for 24 hours before the second coats were applied. The crysolite was applied on the pipes at the rate of 1 gallon of crysolite per 330 square feet of finished pipe. This variety of covering after drying for 3 weeks was found somewhat soft at an ordinary temperature of 70° F. The paint gave a bright, glossy finish.

Sample pipes Nos. 9 and 10 were painted, by brush, with a medium coat of crysolite. They were then wound with a single strip of 4-inch cloth to give a double thickness, as in the case of sample pipes Nos. 3 and 4 Final coats of crysolite were then applied, by brush, until the cloth winding appeared to be thoroughly saturated with the paint. On these sample pipes the crysolite was applied at the rate of 1 gallon for every 120 square feet of covered or finished pipe.

Sample pipes Nos. 11 and 12 were first painted, by brush, with a medium coat of crysolite The samples were then wrapped with medium tar paper as previously described in the case of samples Nos. 5 and 6. After wrapping with tar paper, finishing coats of crysolite were applied by brush. The crysolite was applied at the rate of 1 gallon for each square foot of finished pipe.

Sample pipes Nos. 13 and 14 were covered by turning the sample pipes (heated to about 180° F.) in a trough containing cremo at the same temperature. The samples were allowed to drip off the surplus, and then set aside to dry for 3 weeks. The result was a glossy coating which was tenacious and somewhat soft. The cremo covering was applied at the rate of 1 gallon to each 70 square feet of surface of finished pipe.

Sample pipes Nos. 15 and 16 were covered with cremo, in exactly the same manner as in the case of sample pipes Nos. 13 and 14, except that they were wound with a strip of cloth, 4 inches wide, to give a double thickness of cloth. The winding and covering were done in a trough of melted cremo, as is now done at the various shops of the Peoples Gas Light and Coke Company. The excess of cremo was removed by means of a wooden block which was passed along the revolving pipe. These samples were set aside to dry for 3 weeks and were found, at the end of that time, to be hardened to some extent. The cremo required for this type of covering may be taken as 1 gallon for every 40 square feet of covered pipe.

Sample pipes Nos. 17 and 18 were covered in exactly the same manner as the two preceding pipes, Nos. 15 and 16, with the single exception of the substitution of a 4-inch wide strip of medium tar paper overlapping about 1 inch for the strip of cloth. This method of covering pipes requires 1 gallon of cremo for every 20 square feet of surface on finished pipe. This type of covering is slow to harden, probably due to its thickness.

Sample pipes Nos. 19 and 20 were covered by means of a brush with a medium coat of voltax, No. 105. The first coat applied to the pipe was allowed to dry for 48 hours before the application of a second medium coat. After drying for 3 weeks, the sample presented a covering which was hard, glossy and transparent. This covering dries in about 24 hours. One gallon of voltax will cover 200 square feet of pipe covered in the same manner as the sample pipes Nos. 19 and 20.

Sample pipes Nos. 21 and 22 were covered in exactly the same manner, with cloth, as were pipes Nos. 3 and 4, with the exception that voltax was substituted for carbonkote. After drying for 3 weeks, the covering appeared to be hard and tenacious. This kind of covering requires the use of 1 gallon of voltax to each 60 square feet of pipe.

Sample pipes Nos. 23 and 24 were covered in exactly the same manner as pipes Nos. 5 and 6, with the exception that voltax was used in the place of carbonkote. This covering did not adhere to the pipe very well. The voltax was applied in this case at the rate of 1 gallon for every 155 square feet of finished or covered pipe.

Sample pipes Nos. 25 and 26 were covered by the St. Louis method, as follows: The clean pipes were warmed and covered by brush with a mixture composed of 80 per oent. pitch and 20 per cent. coal tar and slacked lime (1 quart of slacked lime to 1 gallon of tar). A wrapping was then made with a 3-inch strip of buckskin manila paper, that completely covered the pipe in spiral fashion and yet did not overlap at the edges. After this, a second coat of the above-named mixture was applied and a second wrapping of paper was made as before. Two additional costs of pitch (containing just enough of the coal tar and lime to thin it) were applied, and after each of these a wrapping with the paper strip was made. The covering, therefore, consisted of 4 coats of pitch mixture and 4 wrappings of paper. This type of covering was approximately 1-32 of an inch in thickness, and required about 1 gallon for every 100 square feet of covered pipe.

Sample pipes Nos. 27 and 28 were covered with cremo, as described for sample pipes Nos. 15 and 16, except in the substitution of a strip of waterproof paper, 4 inches wide, for the cloth. As in the case of the tar paper, this is hard to apply with hot cremo, as it has a tendency to slide over the pipe while being applied or wound about it.

Sample pipes Nos. 29 and 30 were covered, by brush, with a medium coat of crysolite. This coat was allowed to dry 18 hours, when a strip of waterproof paper, 4 inches wide (previously coated with a medium coat of crysolite on the surface of the paper lying next to the pipe and allowed to dry for 48 hours) was wound around the sample to give a double thickness of paper. A final coating, by brush, of crysolite completed the covering. These were dried for 3 weeks and then presented a covering which was fairly tenacious and of glossy appearance. This coating requires the use of 1 gallon of crysolite for each 105 square feet of pipe covered.

Sample pipes Nos. 31 and 32 were covered in exactly the same manner as the two preceding pipes, Nos. 29 and 30, with the single exception of the substitution of carbonkote for crysolite. This type of covering requires 1 gallon of carbonkote for each 95 square feet of covered pipe. The covering, after drying for 3 weeks, presented a a hard, tenacious coating.

Sample pipes Nos. 33 and 34 were covered in exactly the same manner as sample pipes Nos. 29 and 30 with the exception that voltax No. 105 was used instead of crysolite. Voltax was used in this kind of covering at the rate of 1 gallon for every 100 square feet of pipe covered.

Sample pipe No. 35 was coated, by brush, with a medium coat of ohmlac (1 part by weight of ohmlac dissolved in 2 parts by weight of water gas drip oil). The first coat was allowed to dry for 24 hours when a second coat was applied. This paint dries very quickly and gives a glossy, tenacious coating. This covering required 1 gallon of ohmlac for each 430 square feet of pipe coated.

Sample pipe No. 36 was coated in exactly the same manner as were sample pipes Nos. 3 and 4, with the exception that the ohmlac paint, used on pipe sample No. 35, was substituted for carbonkote. This method of coating pipe requires 1 gallon of ohmlac for each 140 square feet of finished pipe.

Sample pipes Nos. 37 and 38 were coated in the same manner as sample pipes Nos. 3 and 4, with the exception of the substitution of ohmlac No. 1 paint (1 part by weight of ohmlac dissolved in 2 parts by weight of turpentine) for carbonkote. This type of covering requires 1 gallon of ohmlac No. 1 for every 75 square feet of pipe covered.

Sample pipes Nos. 39 and 40 were coated in the same way as sample pipes Nos. 1 and 2, except that ohmlac No. 1 was used in place of carbonkote. The ohmlac No. 1 paint was used at the rate of 1 gallon per 150 square feet of finished or covered pipe. The covering was glossy and apparently tenacious.

Sample pipes Nos. 41 and 42 were painted with tar coating mixture, containing coal and oil tars, rubber cement, etc., as has been previously described. This mixture gave a somewhat thin, tacky coating, requiring 1 gallon for every 450 square feet of metallic surface covered.

Sample pipes Nos. 43 and 44 were immersed in melted sarco pipe-dip, No. 14, at 350° F., until temperature of pipe and dip was the same. Test pieces were then removed and the excess dip allowed to drip off. This treatment gave a coating about .025 inch thick, or a trifle less than 1-32 of an inch in thickness. It gave a smooth, dull-black coating, which was quite adherent and elastic. The samples were coated at the rate of 65 square feet per gallon of sarco dip.

Sample pipes Nos. 45 and 46 were heated to about 200° F. and coated by brush with cremo. A 3-inch strip of buckskin manila paper was then wrapped so that the paper did not overlap but the edges were together, thus giving a single thickness. Three additional coats of cremo and three wrappings with the paper strips were made in much the same manner as the St. Louis method employed for sample pipes Nos. 25 and 26. This coating averaged about .045 inch or 3-64 of an inch in thickness. It resembled in many respects the coatings on pipes Nos. 25 and 26. Cremo to the extent of 1 gallon for every 55 square feet of pipe surface covered was required.

Sample pipes Nos. 47 and 48 were painted, by brush, at ordinary temperatures with sarco cold field coating. It was given 2 coats with a resultant thickness of coating averaging about 1-64 inch. This material gave a somewhat tacky coating, of good adhering qualities.

It necessitated the use of 1 gallon of paint for every 100 square feet covered.

Sample pipes Nos. 49 and 50 were heated to 200° F. and coated, by brush, with hot cremo. A wrapping to double thickness with a 4-inch strip of white fiber paper followed. A final coating with cremo was made. The thickness of this covering was about .055 inch or a trifle under 1-16 of an inch. Cremo to the extent of 1 gallon was required for every 35 feet of pipe surface covered.

Sample pipes Nos. 51 and 52 were dipped in melted ohmlac K35, at a temperature of about 275° F. The excess was allowed to drain off, after the pipe samples had assumed the temperature of the drip bath. The coating was smooth, glossy and somewhat brittle. It was about .040 inch, or slightly over 1.32 inch in thickness. The ohmlac K35 was applied at the rate of 1 gallon per 40 square feet of metallic surface covered.

Sample pipes Nos. 53 and 54 were covered with a thin texaco coating by the Youngstown Sheet and Tube Co. These were special samples of coated 3-inch pipe sent by the above mentioned company. The coating as a whole seemed to have been poorly done. However, two test samples, each 2 feet in length, were selected as being the best portions of some 53 feet of pipe submitted. The coating was apparently extremely thin in spots.

Sample pipes Nos. 55 and 56 were covered with concrete which was tamped into place. The concrete consisted of 1 part by weight of Marquette-Portland cement, and one part by weight of torpedo sand (under 10 mesh), mixed with 15 per cent. of dry mixture of water. It covered the pipes to a minimum depth of ½ inch and was allowed to set in a moist atmosphere at about 70° F. The covered samples were then allowed to dry out thoroughly before testing. The result was a very hard, dense concrete.

Sample pipes Nos. 57 and 58 were covered, by brush, with ebonite to give a thorough coating, which was allowed to dry for 24 hours. It was then wrapped with a 4-inch strip of muslin cloth to give double thickness. Finally, the cloth was saturated with the paint and allowed to dry. After 3 weeks a final coat was brushed on. The ebonite required was about 1 gallon for every 30 square feet of covered pipe. The thickness of the covering was about 1.32 of an inch.

Sample pipes Nos. 59 and 60 were covered in a manner exactly similar to the foregoing samples Nos. 57 and 58, with the exception that acid fume proof paint was used in place of ebonite as a base. This paint filled the cloth somewhat better than did ebonite, probably owing to the greater thickness. It gave coverings of a thickness approaching 1.32 inch, and required 1 gallon of the acid fume proof paint for every 30 square feet of pipe covered.

Sample pipes Nos. 61 and 62 were covered with cloth and paint by the same method employed in the preparation of test pipes Nos. 57 and 58. The paint used, however, was not ebonite, but Depew No. 1. The coating resembled that found on Nos. 57 and 58. It was 1.32 inch in thickness and required 1 gallon of paint for every 25 square feet.

Sample pipes Nos. 63 and 64 were immersed in black monarch dip at a temperature of about 250° until the pipes were at the same temperature as the covering. The coating was uniform, black, hard and glossy, and showed an inclination to be rather brittle. It covered the pipes to an average depth of about 1-64 inch. Every 105 square feet of the pipe surface required 1 gallon of black monarch dip.

Sample pipes Nos. 65 and 66 were coated with red monarch pipe dip at a temperature of about 275° F. This coating was chocolate brown, somewhat transparent, and inclined to be lumpy. It was quite brittle after cooling to ordinary temperature. Red monarch dip gave a coating 1-32 inch in thickness. About 100 square feet of pipe surface per gallon was the rate at which this dip was applied to the test pieces.

Sample pipes Nos. 67 and 68 were dipped in melted cleefite at a temperature of about 250° F. This coating was quite tacky, even after cooling. It was black and semi-glossy in appearance. Cleefite gave a coating of the same thickness and spreading power as red monarch dip.

Sample pipes Nos. 69 and 70 were dipped in cremo pitch at 350° F. until pipes were at the same temperature as the pitch. The test pieces were then removed and allowed to cool; 4-inch strips of muslin cloth were then wrapped on pipes so as to overlap 2 inches and give a double thickness. The test pieces were finally reimmersed in the hot cremo pitch, removed and allowed to cool. The result was a moderately soft, flexible coating, in which the cloth was well saturated with the base. This covering was 3-64 inch in thickness and required about 1 gallon of cremo pitch to cover 35 square feet of pipe.

Sample pipes Nos. 71 and 72 were immersed in Dr. Angus Smith's mixture until the pipe had assumed the temperature of the dip, namely, 200° F. The test pieces were then removed and the excess dip allowed to drip off. This coating gave a black, flexible covering, somewhat harder than that resulting from coal tar pitch containing no linseed oil. The thickness of this protective material was about 1-64 inch; 1 gallon of Dr. Angus Smith's mixture was required for every 100 square feet of surface covered.

Sample pipes Nos. 73 and 74 were immersed in cremo at 180° F. for 10 minutes. They were then taken out, cooled and wrapped with an overlapping edge of a muslin cloth (4-inch strips) to give a double thickness. Each test piece was then reimmersed in cremo for 5 minutes and removed. No excess cremo was removed by means of a wooden block, as in the preparation of sample pipes Nos. 15 and 16, but all mixture which did not actually drain off was allowed to remain as a coating over the cloth. This covering had an average thickness of .045 inch, or about 3-64 inch. The cremo required for this type of covering was 1 gallon for every 35 square feet of pipe surface. This coating, like cremo coverings, hardened slowly.

Sample pipes Nos. 75 and 76 were painted, by brush, with a medium coat of Annapolis mixture and then wrapped with a 4-inch strip of muslin cloth, overlapping 2 inches, to give a double thickness. The cloth was then saturated and coated with the same paint and allowed to dry for 30 days before burial in test boxes. This covering became hard and dry in about a week or 10 days, and gave a thickness of 1-32 inch. The amount of paint necessary for each 60 square feet of surface covered was 1 gallon.

Sample pipes Nos. 77 and 78 were painted, by brush, with a medium coat of mogul electrical compound, which was allowed to dry for 30 minutes, until practically hard. A wrapping with a 4-inch strip of muslin cloth, to give a double thickness, was made. The cloth was then thoroughly saturated with mogul repairing compound. This covering was slightly over 1-32 inch, or about .040 inch in thickness, and required, for each square foot of pipe surface covered, about .0016 gallon of mogul electrical compound and .0455 gallon of mogul repairing compound. This coating was firm and harder than cremo.

Sample pipes Nos. 79 and 80 were first pickled in muriatic acid until all rust, scale, etc., was dissolved. They were then removed from the acid bath, thoroughly washed in a slightly alkaline water and dried immediately before any noticeable rusting action could take place. The dry pipes were then coated by brush with freshly mixed red lead paint and allowed to set and harden. Second, third and fourth coats of freshly made paint were put on at intervals of about 5 days. The final coat had about 1 week of drying before the sample pieces were subjected to the action of the soils. This coating was firm and hard at the beginning of the test. The paint film averaged about .004 inch in thickness and required 1 gallon for ever 800 square feet of pipe surface, or ¼ gallon was necessary, on the average, for each coat applied over an area of 200 square feet.

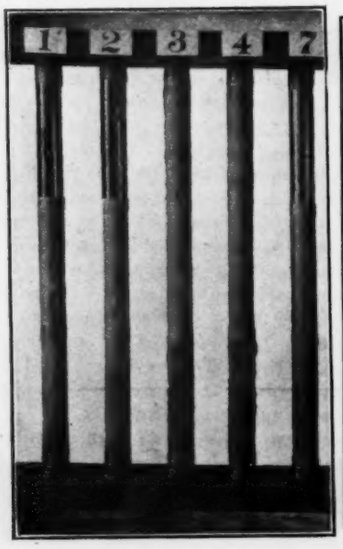
Sample pipes Nos. 61 and 82 were cleaned by a muriatic acid bath and prepared for coating in exactly the same manner as the foregoing samples, Nos. 79 and 80. When perfectly clean and dry they were immersed in a bath of melted sarco pipe dip, No. 15, at a temperature of 350° F., until the pipes had assumed the temperature of the dip. They were then removed and baked for about 1 hour at a temperature not exceeding at any time 400° F. This treatment gave a smooth, uniform, semi-glossy, black coating, which was quite adherent, flexible and malleable. It approximated 1-64 inch in thickness, and required 1 gallon of sarco pipe dip, No. 15, for each 100 square feet of pipe surface coated.

Sample pipe No. 83 was covered with ebonite by the manufacturer of this paint. The coating of this sample was said to have been subjected to a baking process after the application of the ebonite. The coating was semi-glossy and apparently quite thin.

Sample pipe No. 84 was covered, by brush, with a medium coat of ebonite, which was allowed to dry for 2 hours. At the expiration of this drying period a second coat was applied and the whole left to harden for 1 week before submitting the sample to test. The paint film when dry was only .001 inch in thickness. The coating required 1 gallon for each 135 square feet of pipe. The ebonite paint gave a hard, adherent film on the metal.

Sample pipe No. 85 was dipped in melted cremo, at 180° F., and wrapped with a thin grade of rubberized felt in the form of a 3-inch strip overlapping about ¾ inch. A second immersion was made to coat and saturate the rubberized felt. This type of covering was 1-64 inch in thickness and required 1 gallon of cremo for each 100 square feet covered.

Sample pipe No. 86 was covered in the same manner as sample No.



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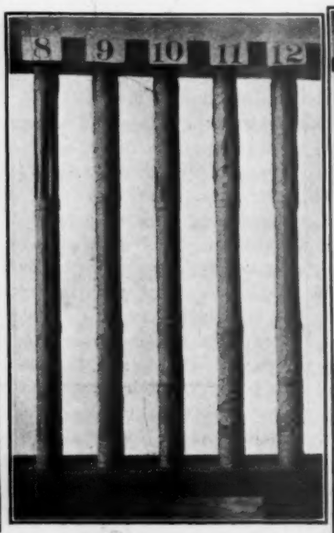

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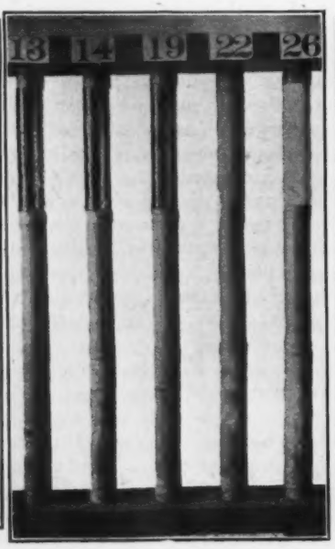

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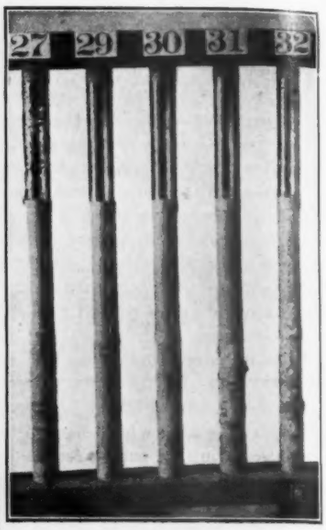

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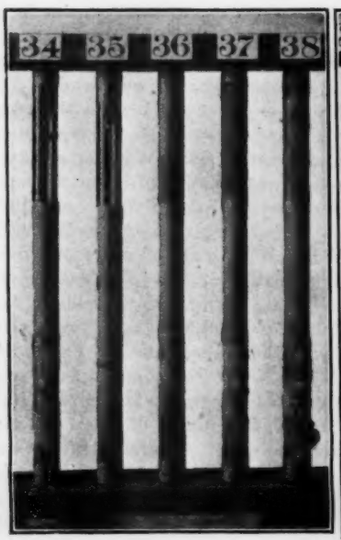

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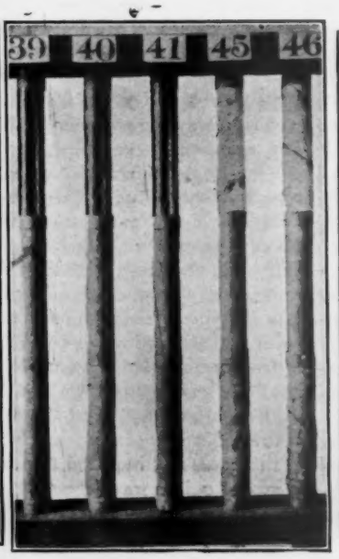

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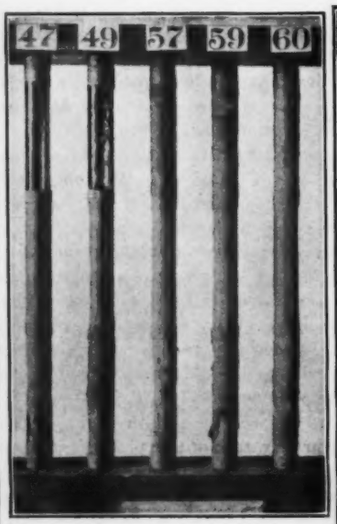

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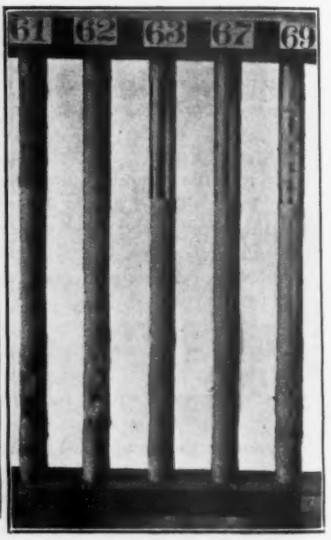

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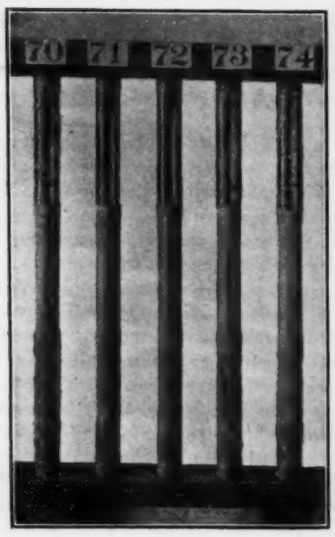

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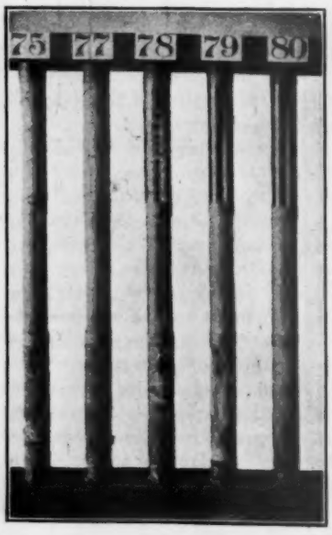

Plate XIV.

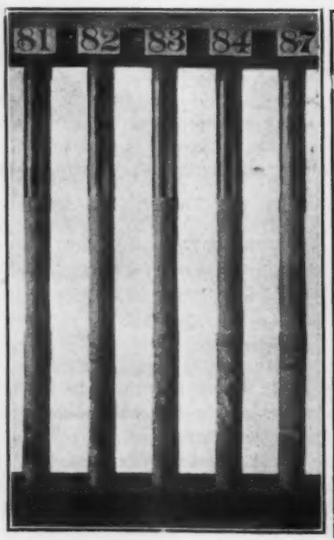

Plate XV.

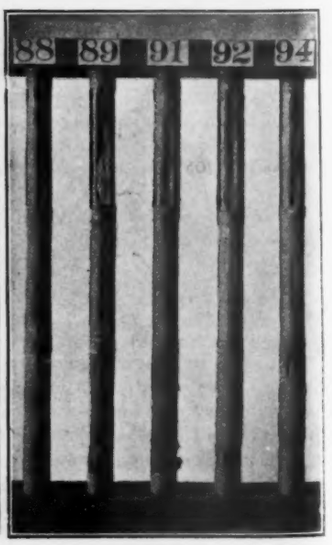

Plate XVI.

85, with the single exception that a heavy grade of rubberized felt, 4 inches wide, was used. This gave a thicker coating, approximating 3-64 inch, and requiring, for each 40 square feet covered, 1 gallon of cremo.

Sample pipes Nos. 87 and 88 were covered with one coat of sarco railroad special coating, and allowed to dry or set for about 24 hours when a second coat of the same paint was applied, by brush, as before. This coating gave a glossy, black film of about .005 inch thickness. This paint was required at the rate of 1 gallon for every 95 square feet of covered pipe.

Sample pipes Nos. 89 and 90 were immersed in water gas tar pitch, at 180° F., until pipes and dip were at the same temperature. The test pieces were then removed and the excess pitch allowed to drip off. This coating had a tendency to run at ordinary temperatures. It was quite soft and adherent. It averaged about 1-64 inch in thickness, and was applied at the rate of about 1 gallon of the pitch for each 100 square feet of pipe covered.

Sample pipes Nos. 91 and 92 were immersed in cremo No. 2 at 180° F., wrapped with 4-inch muslin cloth and subsequently treated in exactly the same manner as sample pipes Nos. 73 and 74. This coating was softer than ordinary cremo. For each 35 square feet of covered pipe 1 gallon of cremo No. 2 was required.

Sample pipes Nos. 93 and 94 were immersed in resistance pipe coating, melted at 300° F. until pipes and dip were at the same temperature. This coating was smooth, dull black and of a waxy appearance. It was quite brittle at ordinary temperatures. This dip covered the test pieces to an average depth of 1-32 inch, and was applied at the rate of 1 gallon for every 40 square feet of surface coated.

The Description of the Porosity and Resistance Test Samples.

As there were over 600 covered samples used in the porosity and resistance tests, no attempt will be made to give in detail the preparation of each sample. The following short description must suffice:

Each coating described under the head of "General Description of Preservative Compounds" was applied over an area of 3 by 4 inches on each side of sheet iron samples averaging .015 inch in thickness and measuring 5 inches in length and 3 inches in breadth. Each protective coating was applied to 12 samples, which had been cleaned by the usual pickling process in muriatic acid, washed and dried. Two of each 12 samples were soldered to an insulated copper wire for the purpose of learning the effect of electrical current flow under low voltage (about 1.5 volts) to or from a preservative coating. Many sheet iron samples retaining their natural black oxide film, and others having a complete coat of rust, were covered with various paints and dips to determine the general effects of the surface of the metal upon the overlying protective material. A large number of the preventatives of corrosion were also put upon 3 by 5-inch samples of the wrapping materials which have been previously described. All paints were applied in two separate coats, of which the first was allowed to harden before placing on the second. As a rule, the dips were made only once, but the samples were gently baked for a few minutes at the temperature of the dip to give a smooth, uniform coating.

In order to simplify the necessary description of these samples, Table III. of data relative to the coatings and coverings on the sheet iron samples is given.

Description of the Volatility and Oxidation Test Samples.

In this test no detailed description of the test samples is necessary. It is sufficient to state that the majority of the preservative compounds were placed upon the weighed and clean glass slides in films of approximately the same thickness as those put upon the samples prepared for the porosity and resistance tests.

Data—Results of the Electrolysis Test.

The first part of the electrolysis test, namely, that portion in which determinations were made of the relative variations in the electrical resistances of many of the coatings and coverings due solely to the actions set up by soil constituents, was productive of an accumulation of data which show that protective materials on pipe are subject to considerable reduction in their insulative resistances after burial in wet soils where no electrolytic conditions have been set up by forces foreign to the pipe covering or soil waters.

Table III.

Sample No.	Kind of Coating.	Number of Coats Applied.	Temperature of Application in Deg. F.	Average Thickness of Protective Film in Inches.
1	Cremo	1	180	.008
2	Annapolis mixture	2	70	.006
3	Dr. Angus Smith's mixture	1	200	.008
4	Red lead paint	4	70	.005
5	Sarco pipe dip	1	400	.0035
6	Concrete	1	70	.500
7	Ebonite	2	70	.001
8	Carbonkote No. 1	2	70	.0015
9	Crysolite	2	70	.0045
10	Voltax	2	70	.0025
11	Acid fume proof paint	2	70	.0025
12	Depew's No. 1	2	70	.002
13	Mogul electrical compound	2	70	.0035
14	Mogul repairing compound	2	70	.0085
15	Carbonkote No. 100	2	70	.002
16	Ohmlac No. 1	2	70	.0015
17	Tar coating mixture	2	70	.0015
18	Sarco cold field coating	2	70	.004
19	Sarco R. R. special coating	2	70	.005
20	Ohmlac K 35	1	275	.007
21	Black monarch dip	1	240	.014
22	Red monarch dip	1	270	.022
23	Cleefite	1	300	.005
24	Cremo pitch	1	180	.095
25	Water gas tar pitch	1	180	.055
26	Cremo No. 2	1	180	.013
27	Resistance pipe coating	1	300	.0105
28	St. Louis mixture	1	150	.019
29	Cremo No. 3	1	180	.013
30	Cremo No. 4	1	180	.011
31	Texaco	1	350	.009
32	Coal tar pitch, 600° F.	1	200	.018
33	Coal tar pitch, 700° F.	1	250	.016
35	Water gas tar pitch, 700° F.	1	200	.003
36	Mineral rubber pipe dip, 250° F.	1	275	.016
38	California refined asuhaltum	1	300	.0075

The duration of each test, and the general description of the final condition of each coating and covering on individual electrolysis test samples, will be given in Table V. The explanations are the result of careful observations made upon the entire sample from which the protective material was removed for about two-thirds of its length. The general appearance of the coatings and coverings before and after the electrolysis tests, as well as the condition of the pipe beneath the protective material after the completion of the experiments, is shown in Plates V. to XVI., inclusive. The views given show on the upper third of each sample the appearance of the newly coated pipe, on the middle third the condition of the pipe itself after removing the coating and cleaning with a wire brush, and on the bottom third the appearance of the coating or covering at the end of the electrolysis test. The iron bands connected to the negative terminal of the dynamo were almost completely corroded in separate pieces at the end of 6 months' test. In a number of instances a tendency on the part of the sample pipe coatings to rise in temperature, owing to the passage of electrical currents, was observed.

(To be Continued.)

Items of Interest
FROM VARIOUS LOCALITIES.

Last Saturday a special town meeting of the Trustees of Fairhaven was called for, the object of which was to instruct the Selectmen as to the terms of arranging for an extension of the gas mains of the New Bedford (Mass.) Gas and Edison Light Company to and through Fairhaven, the residents of which have been quite clamerous of late for such service.

The Portland (Ore.) Gas Company has instituted suit in the Circuit Court against the steamer "Claremont" and the Hardwood Lumber Company to recover damages to the pipe line of the former which line passes along the bed of the Willamette river. The Gas Company was engaged in laying a new main across the river south of the structure known as the Steel bridge, and at the time in question one end of the pipe was being carried on the paying-out barge. The steamer struck the latter and broke the pipe. The latter speedily sunk. The complaint alleges the grossest of carelessness on the part of those moving the vessel.

THE Lawrence (Mass.) Gas Company has concluded the purchase of a tract of land, 100 by 100, the frontings being on River and Kimball streets. This does not necessarily mean that the Company is proposing to construct a new plant at once, but it does mean that when it is ready—and its business is increasing at a wonderful rate—to move in such matter no time need be lost over the securing of a proper site.

"B. F. J.," writing from Augusta, Ga., under date of the 27th inst., says: "Following a recent conference between Mr. E. A. Potter, President, and other officials of the Augusta Gas Company, the Mayor and a Special Committee of the Gas Committee of City Council, the announcement was made that, beginning the 1st prox., all gas supplied will be charged for at the rate of $1.40 per 1,000 cubic feet, with a rebate of 20 cents per 1,000 for payment within 10 days after bill falls due. This means a net reduction of 5 cents per 1,000 cubic feet, compared with the present dual scale of prices. Gas sent out now on illuminating account is billed at $1.75 per 1,000, with a rebate of 25 cents per 1,000 for prompt payment, and gas sent out on fuel account sells at $1.25 per 1,000, with the rebate of 20 cents per 1,000. Under the scale the average price will be $1.20.

WE are informed that the Reading Electric Company, of 9 North Fifth street, Reading, Pa., has been awarded a contract for the construction of the gas plant proposed for the Myerstown (Pa.) Gas and Fuel Company. The contract calls for a 1½-story building for the generating apparatus, a 20,000-foot holder and other items. It is further said that the piping scheme calls for the connecting-up of the outlying district of Richland.

UNDER the contract between Mr. J. J. Donelan, of Vinton, Ia., and the City Council of Waverly, Ia., under which the former was to construct and operate a gas works in Waverly, the authorities have agreed to cut out the section which required Mr. Donelan or his Company to pay to the city an annual tax of 2 per cent. on the gross income.

HOLDERS of the first mortgage bonds (25 years, 5 per cent. return) of the Berwick (Pa.) Consolidated Gas Company, for which properties receivers were appointed towards the close of last June, are asked to deposit the bonds with the Union Trust Company, of Lancaster, Pa., as depository, in exchange for transferable receipts. The protective committee which has been formed asks for prompt action in order to enable them to prevent the issuance of receivers' certificates, to foreclose the mortgage and gain possession of the property. Mr. Jno. M. Grott, of Lancaster, Pa., is counsel for the committee.

ON the 24th ult., the Massachusetts Board of Gas and Electric Light Commissioners issued its approval in the case of the petition of the Edison Electric Illuminating Company, of Boston, Boston Consolidated Gas Company, Chelsea Gas Light Company, Newton and Watertown Gas Light Company, and the Waltham Gas Light Company, asking the approval of the Board of the sale to the Edison Electric Illuminating Company, of Boston, of the electric locations and properties of the Boston Consolidated Gas Company and of the other Companies named, and also for the approval by the Board of the purchase of the gas franchises and property of the Waltham Gas Light Company by the Newton and Watertown Gas Light Company. The report says in part:

"By the terms of the several contracts executed by these Companies with each other, the Edison Company is to pay for the electric location and property of the Boston Company, $1,300,000; for those of the Chelsea Company, $350,000; those of the Newton Company, $500,000; those of the Waltham Company, $600,000; and the Newton Company is to pay $500,000 for the property of the Waltham Company. The The several Companies also covenant that they will not further prosecute the business of furnishing electricity or gas, as the case may be, as heretofore.

"The $1,300,000 to be paid for the electric property of the Boston Company is to be used to cancel an equal amount of its floating debt. The Waltham Company is to be liquidated. After its purchase of the Waltham Company the capital and debt of the Newton Company will be the same as now, as it is to receive the amount for its electric property. The outstanding bonds of the Chelsea Company are to be cancelled. The direct result of the transaction will be to separate in these communities the gas business from the electric business. The facilities for furnishing and distributing light, heat and power will not in any event be diminished.

"It is clear that gas and electricity can be profitably supplied over far wider areas than was formerly thought feasible. Greater efficiency in operation and greater economies in costs are possible with a large lighting company serving a given territory than to several independent companies serving different sections of the same territory. There is a public advantage in having the gas and electric business separately conducted and under independent management and control. The natural rivalry between the two should result in substantial benefits to the public.

"It may safely be assumed that the Edison Company can readily supply electricity to the territories of other companies at lower costs than those companies could be expected to do. The advantages to the public from the consolidation of the Newton and Waltham gas properties, after disposing of their electric business, may reasonably be expected to lead to substantial reductions in price and improvement in service.

"The maximum net prices for electricity in the districts of the several Companies are: Edison, 12 cents; Boston, 14 cents; Newton, 12 cents; Chelsea, 15 cents; Waltham, 16 cents per kilowatt hour. Prior to the present year the price in Newton was 18 cents, but it was reduced in anticipation of the transfer of its electric property to the Edison Company. The immediate results of the consolidations will be the establishment of the Edison prices throughout the territory. The Edison Company has also assured the Board that, after it has had time to avail itself of such economy as may follow the consolidation, it will reduce the maximum price to 11 cents throughout the territory not later than January 1, 1911. With respect to the price of gas the Board has the assurance of the parties in interest that the price of gas supplied by the Newton Company after the purchase of the Waltham Company shall be reduced from the present price of $1 to 95 cents on or before January 1, 1910."

At the hearing upon this application it incidentally appeared that conditionally, upon the sale of the electric property of the Chelsea Company, the Board will be requested to approve a consolidation of the Chelsea and East Boston gas properties, and it was stated that, in the event of such a consolidation, the price of gas in the joint territory would be reduced to 90 cents.

A BILL in equity was recently filed by G. M. Roads, Attorney for the Schuylkill Haven (Pa.) Gas and Water Company, to restrain the County Commissioners from selling its plant for taxes, the sale to be at public auction. In 1902 and 1903 the 60-foot lot on Broadway, owned by the Company, was assessed and tax bills rendered, but those remained unpaid. In 1904 the ground was returned to the Commissioners and subsequently sold by the County Treasurer. In the latest instance the plot and the structure upon it were to be offered for sale at Commissioners' land sale, which sale would carry transfer of title. The Company meanwhile contended that as it has paid an annual tax to the State upon its capital stock, which stock it claims includes the lot and buildings, wherefore it is liable to no further taxation on such account. The Court applied to issued a temporary injunction, to be in effect until the case has been tried on its merits.

MR. WM. RAY, of Chicago, has been appointed General Manager of the gas and electric interests of the Giest syndicate in Michigan City, Hammond, Indiana Harbor, Whiting, East Chicago, West Hammond, Burnham and Chesterton, with headquarters in Hammond.

ANNOUNCEMENT was recently made that the San Bernardino (Cal.) Gas and Electric Company (a possession of the Pacific Light and Power Company) would increase the selling rate for gas to $1 per 1,000 cubic feet. The current rate is 75 cents per 1,000 cubic feet. The increase is based on the increased rates now being paid for oil and other supplies. On the other hand, the consumers claim the advance is altogether attributable to the recent consolidations that have been made in the gas and electric lighting interests of the San Bernardino Valley. No matter what the motive was that prompted the increase, none may truthfully deny the statement that $1 per 1,000 for the gas supplied in that district (it will easily average 18 candles) is indeed a most reasonable one.

THE Boston Consolidated Gas Company is this year the largest single taxpayer in the city of Boston. The tax amounted to $32,622.

THE earnings of the Denver (Col.) Gas and Electric Company for the fiscal year ended July 31st, 1909, amounted to 17.70 per cent., as against 13.89 per cent. for the preceding year.

THE new owners of the Willimantic (Conn.) Gas and Electric Company have named the following executive management for the ensuing year: Directors, J. A. Southard, J. F. Ahern, A. J. Campbell, H. C. Murphy and F. C. Slade; President, A. J. Campbell; Vice-President, F. C. Slade; Secretary and Treasurer, J. A. Southard.

THE contract with the Rising Sun Company, for the public lighting of Boston (the contract was originally set to terminate the 15th inst.), has been extended by Superintendent Emerson, of the Street Department, to February 1st, 1910. Under the old contract the city paid $24.96 per lamp, but under the extended contract the payment will be $23.61 per lamp. Meanwhile, as between now and the period last named, a new scheme for the future lighting of the city will have been perfected. Superintendent Emerson deserves much credit for the stand he took (and from which stand he never budged) in this matter.

MR. JOHN N. LYMAN, who acceptably served the East Hampton (Mass.) district in the Massachusetts Legislature for the last two terms, has declined to accept a renomination. His main reason for this determination is the fact that he has been appointed Manager of the Easthampton Gas Company.

THE authorities of Port Huron, Mich., finding that Mr. Lynn and his associates, in consideration of their being granted an extension of their gas franchise at that point, because they will not be cajoled or driven into agreeing to supply gas at a non-profitable rate, now threaten to go into the business of gas making on municipal account.

THE Gas Bench Construction Company, writing under date of the 30th ult., informs us that contracts closed by it, during the week ended that date, include the refilling of 4 half-depth 6's for the Citizens Gas and Fuel Company, of Terre Haute, Ind., and the refilling of 2 half-depth 6's at the works of the Union Gas and Electric Company, of Bloomington, Ills., both of which plants are controlled by the Railways' Equipment Company, of New York. Another contract is the installing of two beds of half-depth 6's at the plant of the Huntsville (Ala.) Company.

"T. R. L.," writing under date of the 24th ult., in Sacramento, Cal., incloses the following: "The Pacific Gas and Electric Company, which operates in 26 counties, and has some 4,000 employees, including those in Sacramento, has just moved into its new headquarters building on Sutter street, in San Francisco, and in making the move has introduced a number of suggestive innovations planned for the comfort of the 250 men and women comprising the office and executive forces. A desk with couch and writing desk, and a lunch room with a gas stove and wash sink and table, have been provided for the force of telephone girls and women typewriters and clerks, and the flat top of the 6-story building has been made into a combination sun yard and commanding observatory, with glass walls on the windy sides to offer protection without obstructing the splendid panoramic view of Union square and most of the important landmarks and buildings of the city. For the men there is an assembly room for instructive stereopticon lectures and a reference library, made up of books on gas and electricity, comprising what experts say is the finest technical collection of its kind in the world. In the basement there is a bathroom with hot and cold water, so that the engineers coming in dusty or grimy from trouble calls to power stations may clean up before returning to their upstairs offices or going home. In addition to the plans for conserving the personal energy and effectiveness of its employees, the Company introduced a number of the latest mechanical contrivances for saving time and work, and established a private post office, catching all letters from the mail chute, because it was figured that by inspecting and then bunching the letters an aggregate of $100 a month could be saved in stamps alone, whereas, the old method permitted a large number of individually-stamped envelopes to go out to each of the outside companies. Dictating machines, letter-addressing machines to do the work of directing 100,000 bills a month in San Francisco alone, and dictograph devices, to permit ready inter-communication of all the departments form part of the equipment."

MR. JAMES M. DAILY, of the voucher division of the Denver (Col.) Gas and Electric Company, has been appointed Secretary of the Pueblo (Col.) Gas and Fuel Company.

"J. G.," writing from Allentown, Pa, under recent date, says: "The experiment undertaken early last month (August) by the Allentown Gas Company, to show the effect of gas as a street lighting agent, has been voted a success. The offices of the Company are in the Commonwealth building, and before which structure runs a moderately wide sidewalk. The Company, in carrying out the experiment, erected two large, ornamental lamp posts along the curb, and in the lanterns placed four 500-candle gas arcs, with the result that several gas arcs have since been ordered for other business points in the city. The posts, which are 14 feet high, are of Doric design, and of a type quite ornamental. Other arcs to the number of 5, have been placed at suitable elevations on the front of the building, which arrangement resulted in an illumination, the like of which was never equalled in Allentown. Superintendent Frick has also made many improvements on the generating and purifying plants this season, and the main system has also received a goodly share of attention."

MR. J. M. CUNNINGHAM retired voluntarily from the position of Manager of the Bay City (Mich.) traction, gas and electric light properties, in order to devote his attention to large properties in Henderson, Ky., which properties came to him through the death of an uncle.

IT is quite likely the fact that the Penobscot Bay Electric Company has succeeded to the ownership of the properties heretofore operated by the Bath (Me.) Gas and Electric Company.

MR. Z. T. BELL, as a result of the consolidation of all the gas and electric lighting properties in the San Bernardino (Cal.) Valley, has been appointed Superintendent of the amalgamated interests. He was Superintendent of the Home Gas Company, of San Bernardino.

A CORRESPONDENT in Wilmington, Del., sends the following: "The new office building of the Wilmington Gas and Electric Company, which is to be erected at 825 Market street, on the site of the present building by the A. S. Reed & Brothers Company, will be attractive, as well as roomy and more convenient for the public who will visit it, and for the working force that shall find headquarters there. The plans, which were drawn by Charles Barton Keen, a Philadelphia architect, have been submitted to Building Inspector Johnson for his approval. Mr. Johnson says they conform to the local building regulations, and he is much pleased with them. The building will be as nearly fireproof as it is possible to make it. It will have the same frontage on Market and Shipley streets as the present building, and will be four stories high. The construction will be principally of steel and brick, with wide windows on each floor. In fact both fronts will be nearly all glass. The brick to be used will be what is known as tapestry brick, something new in Wilmington. Tapestry bricks have a face about 3 by 10 inches, are very rough and variegated in color. The effect is pleasing. The work of tearing down the present building and erecting the new one is to be started as soon as practicable. The present building has been vacated, the Company moving its entire force to the temporary offices at the southeast corner of Fifth and Orange streets, where it will remain until the new offices are ready for occupancy. The Shipley street end of the new building will be double the width of the Market street end."

THE report of the Dallas (Tex.) Gas Company to the authorities shows that the capital stock (equally divided between common and preferred) amounts to $1,000,000, and that the total indebtedness is $790,000. The gross income for the last fiscal year was $101,098.38 and that it has 5,917 meters in operation. The gross income was made up thus: Receipts from gas, $90,533.04; gas stoves and other appliances, $8,825.00; from sales of coke, tar, etc., $1,774.25. The total expenses were returned at $313,932.60, in which bills payable figure at $209,500. Salaries took up $7,689; wages, $18,022.15; coal, $20,000.

THE first meeting of the incorporators of the Santa Barbara (Cal.) Gas and Electric Company was held in Santa Barbara the last week in August. A resolution creating a bonded debt of $1,000,000, to be partly used in addition to certain capital stock in the purchase of the Merchants Mutual Light and Power Co., and of the gas and electric properties of the Edison Electric Company, in Santa Barbara, was passed. The officers chosen were: President, C. H. Frink; Vice-President, R.H. Ballard; Secretary, S. M. Kennedy; Treasurer, Herbert F. Keenan. A special meeting of the stockholders, to ratify this action, was called for the 25th prox.

"L. B. R." is informed that the current dividend (1½ per cent.) on the common stock of the Laclede Company is payable Tuesday week.

The Market for Gas Securities.

Despite the odd conditions of the general share market during the week, when the undoubted general trend was towards lower prices, Consolidated managed to more than hold its own; and that, too, in the face of rather free offerings, at the outset intended for bear account. The opening to-day (Friday) was made at 147¼ to 147½, and a good all round inquiry was in evidence. The sharp rise in it is sure to come, it is delayed rather than sidetracked.

Brooklyn Union is 150, bid, and the shares are decidedly close held. Peoples, of Chicago, is again showing more than average strength; and Washington (D. C.) gas is 363 bid. This stock, the writer was informed by one of the best financial sharps of the Nation's Capitol, is sure to pass 400 before the Christmas holidays.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

SEPTEMBER 6.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capitol.*	*Par.*	*Bid.*	*Asked.*
Consolidated Gas Co.	$78,177,000	100	147¼	147⅛
Central Union Gas Co.—				
1st 5's, due 1972, J. & J.	8,000,000	1,000	98	101
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River—				
1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	150	152
1st Con. 5's, due 1948, M. & N.	15,000,000	—	91½	92
Yonkers	999,650	500	190	—
Out-of-Town Companies.				
Bay State	50,000,000	50	1⅛	1¼
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73½
Capital, Sacramento	500,000	50	—	95
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,660,000	1,000	104	105¼
Cincinnati Gas and Electric Co.	22,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	95	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90½	91
Preferred	3,036,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Cheasapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	102
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104½	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	103	103½
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	36
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	104	105
Preferred	2,500,000	100	—	98
Bonds	10,000,000	1,000	104	—
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	106½
" 6 per cent. scrip, due 1910	100,000	25	60	60½
Massachusetts Gas Companies, of Boston	25,000,000	100	65½	65¾
Preferred	25,000,000	100	91	91¼
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
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New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	116	116¼
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104½	105½
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St. Joseph Gas Co.—				
1st Mtg. 5's	751,000	1,000	100	102

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Position Wanted
As Superintendent,

By a competent gas man who has had practical experience in all branches of the business, both coal and water gas. At present employed. A-1 references.

1755-tf Address, "R. C.," care this Journal

Position Wanted

As Superintendent or Manager of a Water Gas Company.

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Position Wanted.

Experienced Gas and Stove Solicitor and Collector

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Young married man, engineering graduate and now employed as general superintendent of several gas properties, desires to make a change to position as department superintendent manufacturing or distribution of larger company. Can show results in either.

Address, "CLAY,"

1787-2 Care this Journal.

WANTED,
A Position as Manager or Superintendent

Of a coal or water gas plant, or combined plant. Am getting the best of results at present place of employment. Have excellent recommendations. Address, "F. J. R.,"

1787-4 Care this Journal.

Position Wanted
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Seven years' experience. Can show results. At present employed. First-class references.

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1786-2 Address, "SOUTH," care this Journal.

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WANTED,
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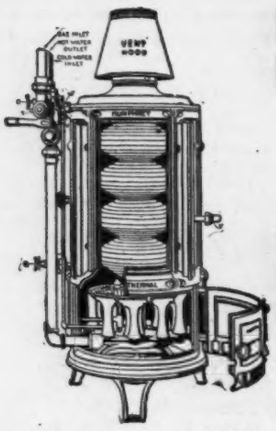

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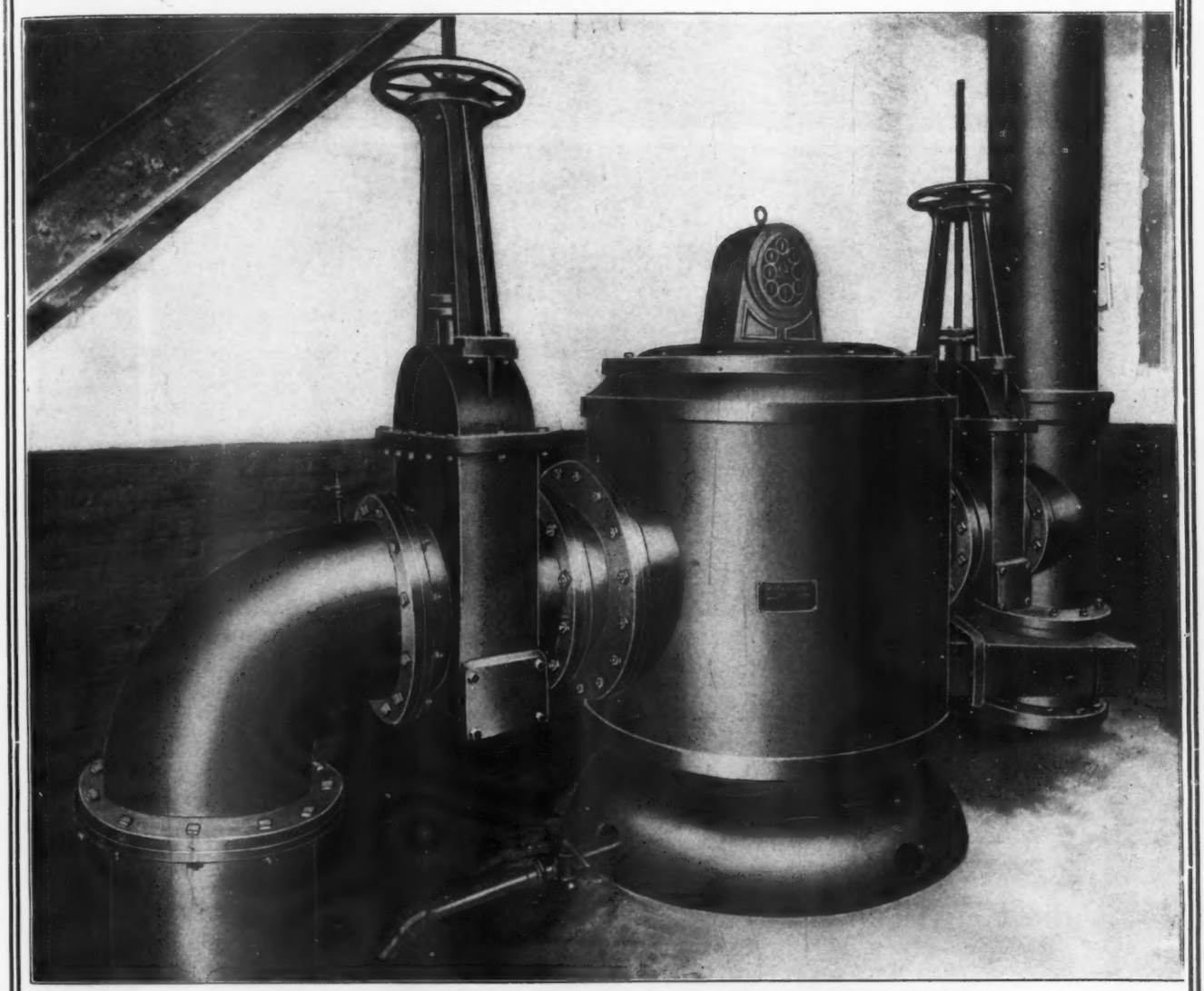

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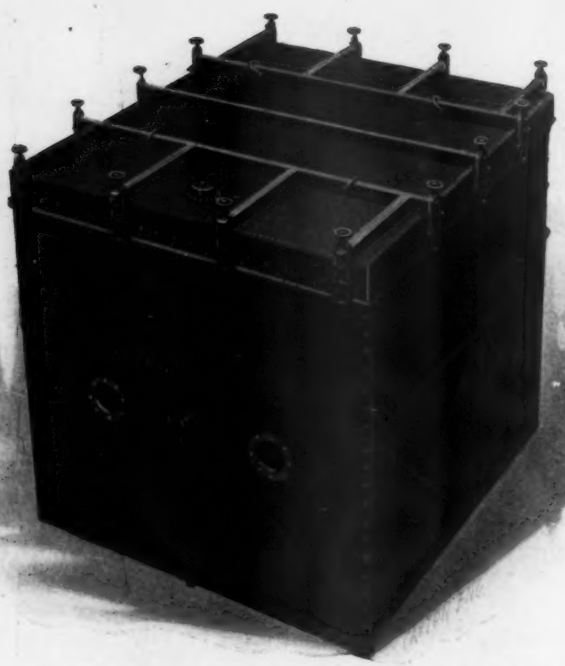

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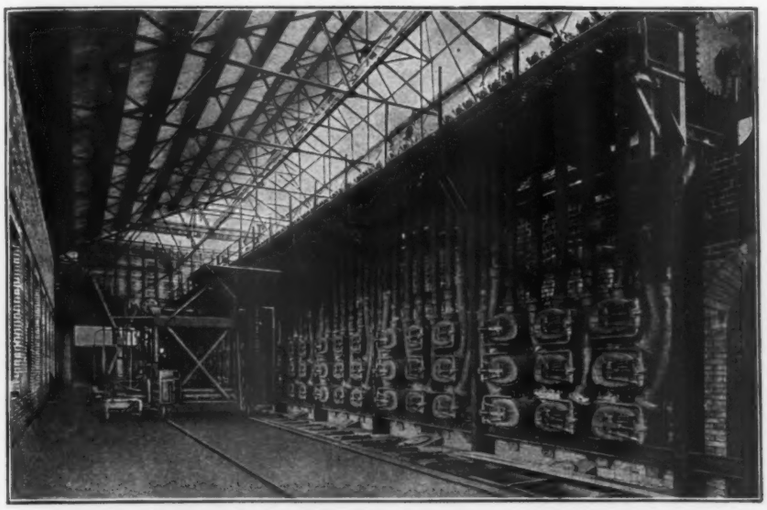

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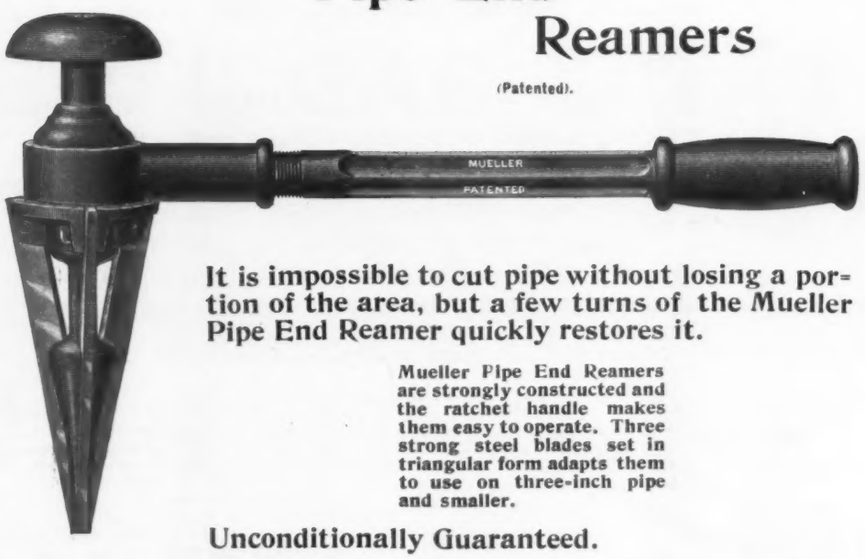

It is impossible to cut pipe without losing a portion of the area, but a few turns of the Mueller Pipe End Reamer quickly restores it.

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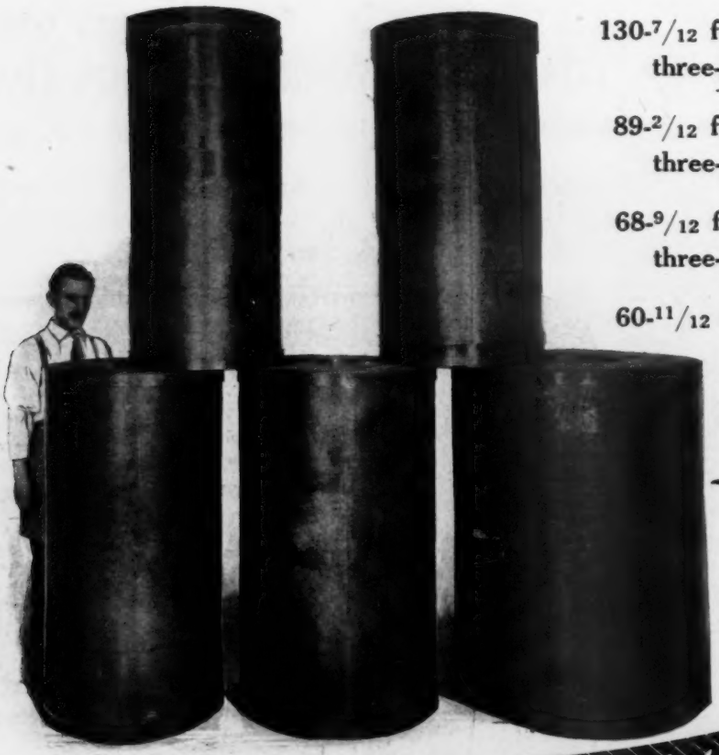

130-7/12 feet, 50 inches wide; extra heavy three-ply leather belting.

89-2/12 feet, 50 inches wide; extra heavy three-ply leather belting.

68-9/12 feet, 50 inches wide; extra heavy three-ply leather belting.

60-11/12 feet, 50 inches wide; extra heavy three-ply leather belting.

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DENVER, 1622 Wazee St.
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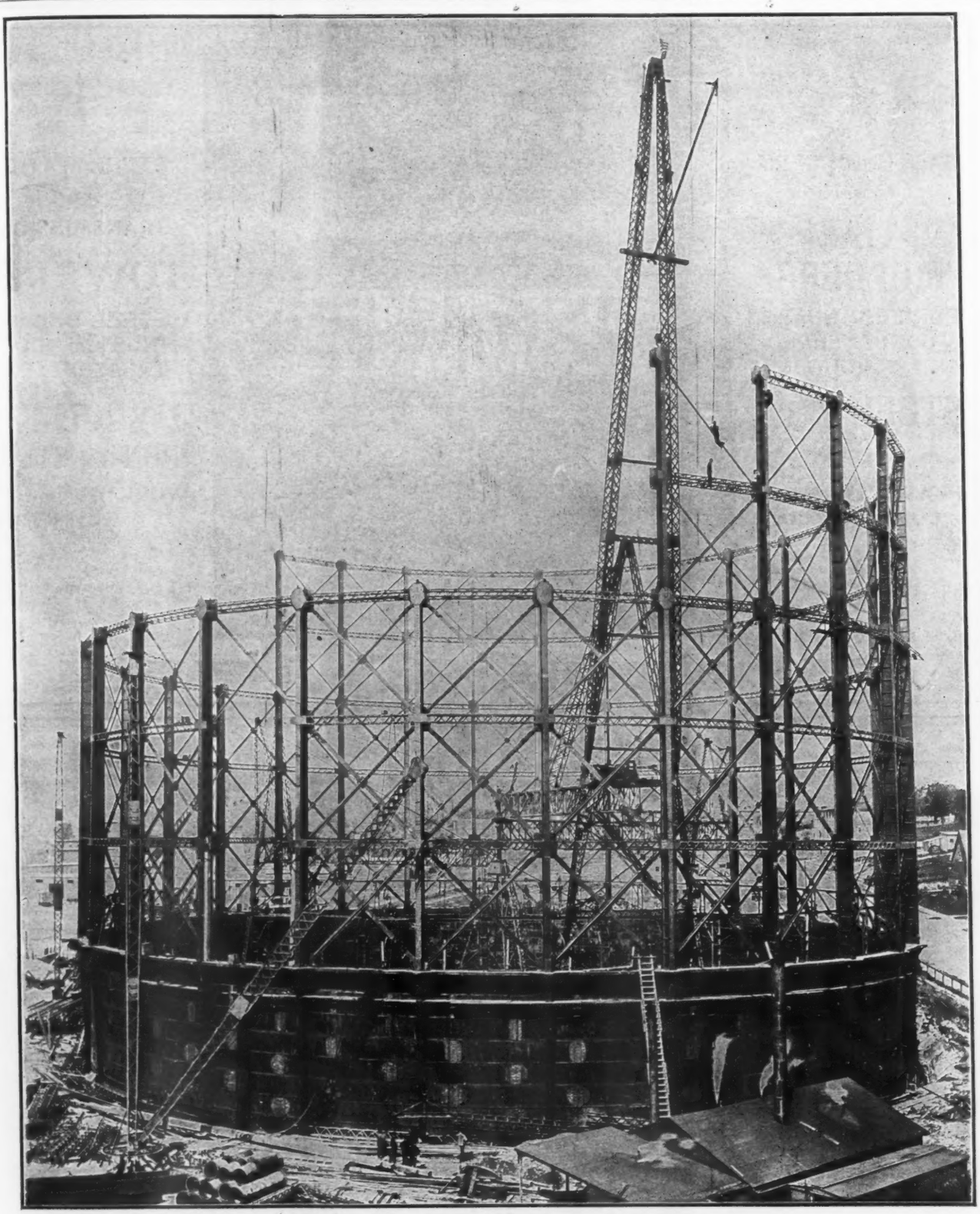

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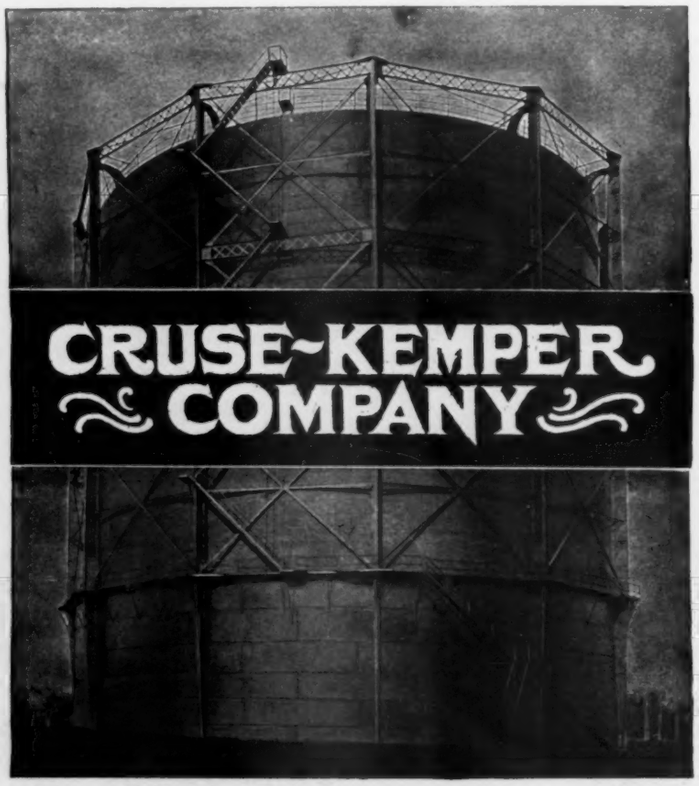

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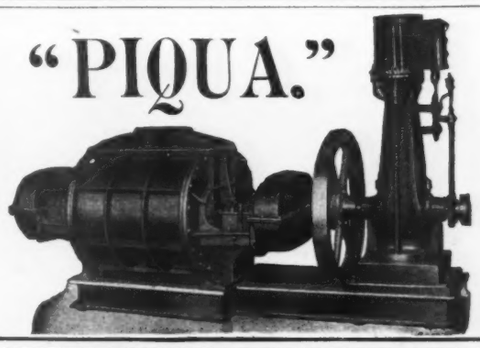

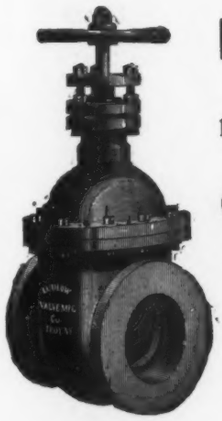

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It has been said, "Why change the routine of a successful factory?" We might say, you cannot keep it from changing. You can help it to change. The first *implies* a retrograde movement, whereas the second *may* mean advancement. Possibly you have had the same style of bench put in year after year. It may have been good and might continue to give excellent results. But look at this side. Man first walked, then ran, afterwards rode and now flies. If he had been content to walk he would, perhaps, have developed into a Weston, but his comparative progress would have resembled that of the proverbial snail. And it must not be forgotten the snail would have had the advantage but for mechanical aids clearing, by driving, a way for the walker. It is an indubitable fact that anything which fails to go forward cannot stand still. An all-wise Providence enacted that all life must have movement, and our endeavor should be to move forward.

Routine is right in its way, but it is not by such methods this country has so far outstripped all others in its approach to the ideal. "Get busy" is a term which is symbolical of American success. It is trite but true. To get busy does not signify accelerating the motion, such as is done by speeding up the roughriding horses on a public park round-about. Rather does it mean quickness of thought on correct lines, followed by rapid action and speedy accomplishment. In other words, it would be following routine to order "the kind you have always had" when your benches need resetting. Anybody can act in this way, and possibly act wisely at that; but to be sure the judgment is sound the ordering must be done only after alternatives have been given due consideration. It is more than likely that since your last order was placed betterments have been made in product or design. The company you are buying from may be better able to meet your needs than another can, but that happy state of affairs (for you and them) cannot last unless they are given impetus towards better work than they are now doing.

Is it possible to believe that aviation would now be what it is—a successful accomplished fact—if the Wright brothers had not stimulated Bleroit, Latham, Lambert, Curtis and others to get out of the routine work and been themselves egged on to do better by the work of these later day aeroplanists? In the same way we may not be now, later on, or even eventually, the best able to supply your wants, but we mean to try all the time to get better results, and by so doing must act as an incentive to others to improve. You will help yourselves by supporting our effort to improve gas plant conditions.

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—FOR—
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PUBLIC LIGHTING TABLE.

SEPTEMBER, 1909.

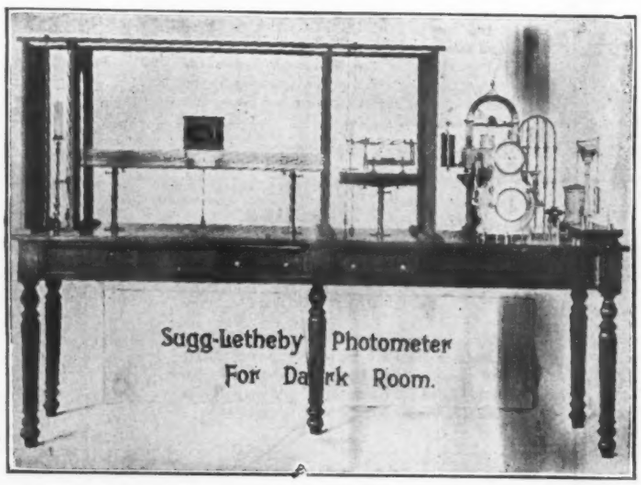
Table No. 1.
FOLLOWING THE MOON.

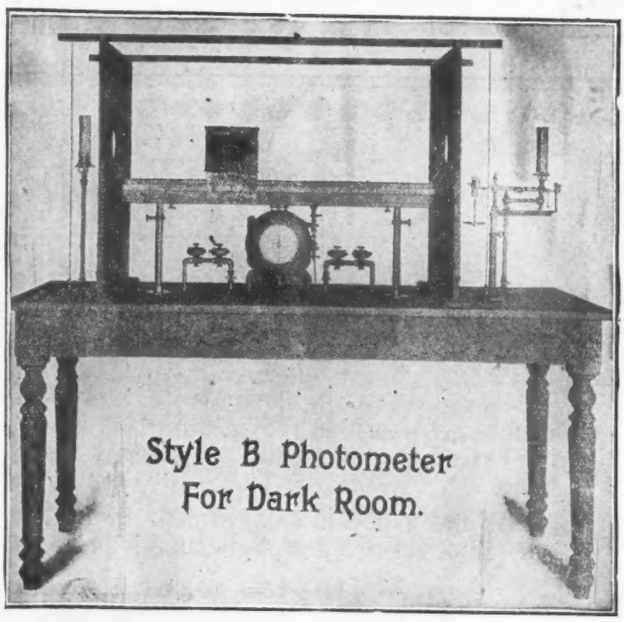
Day of Week.	Date.	Light.	Extinguish.
Wed.	1	7.00PM	8.50PM
Thu.	2	7.00	9.20
Fri.	3	7.00	9.50
Sat.	4	7.00	10.20
Sun.	5	6.50	11.00
Mon.	6	6.50LQ	11.40
Tue.	7	6.50	12.30AM
Wed.	8	6.50	1.20
Thu.	9	6.50	2.20
Fri.	10	6.50	3.20
Sat.	11	6.50	4.40
Sun.	12	6.40	4.40
Mon.	13	6.40	4.40
Tue.	14	6.40NM	4.40
Wed.	15	6.40	4.40
Thu.	16	6.40	4.40
Fri.	17	6.40	4.40
Sat.	18	6.40	4.40
Sun.	19	7.40	4.50
Mon.	20	8.10	4.50
Tue.	21	8.50	4.50
Wed.	22	9.40FQ	4.50
Thu.	23	10.30	4.50
Fri.	24	11.40	4.50
Sat.	25	12.50AM	4.50
Sun.	26	2.10	4.50
Mon.	27	3.20	4.50
Tue.	28	No L.	No L.
Wed.	29	No L.FM	No L.
Thu.	30	No L.	No L.

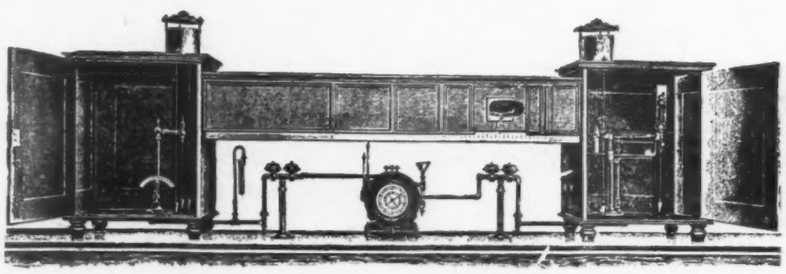
TOTAL HOURS DURING 1909.

By Table No. 1.

	Hrs.Min.
January	212.20
February	183.40
March	173.00
April	151.10
May	144.10
June	138.50
July	145.40
August	160.30
September	180.00
October	201.00
November	216.30
December	233.40
Total, yr.	2140.30







Closed Photometer For Light Room.

CIRCULARS SENT ON REQUEST.

PUBLIC LIGHTING TABLE.

SEPTEMBER, 1909.

Table No. 2.
NEW YORK CITY.
ALL NIGHT LIGHTING.

Day of Week.	Date.	Complete Lighting in One Hour From Time Given P. M.	Complete Extinguishing in 50 Minutes From Time Given A. M.
Wed.	1	6.27	3.57
Thu.	2	6.27	3.57
Fri.	3	6.17	4.07
Sat.	4	6.17	4.07
Sun.	5	6.17	4.07
Mon.	6	6.17	4.07
Tue.	7	6.12	4.07
Wed.	8	6.12	4.07
Thu.	9	6.12	4.07
Fri.	10	6.02	4.17
Sat.	11	6.02	4.17
Sun.	12	6.02	4.17
Mon.	13	6.02	4.17
Tue.	14	6.02	4.17
Wed.	15	6.02	4.17
Thu.	16	6.02	4.17
Fri.	17	5.52	4.27
Sat.	18	5.52	4.27
Sun.	19	5.52	4.27
Mon.	20	5.52	4.27
Tue.	21	5.47	4.27
Wed.	22	5.47	4.27
Thu.	23	5.47	4.27
Fri.	24	5.37	4.37
Sat.	25	5.37	4.37
Sun.	26	5.37	4.37
Mon.	27	5.37	4.37
Tue.	28	5.32	4.37
Wed.	29	5.32	4.37
Thu.	30	5.32	4.37

TOTAL HOURS DURING 1909.

	Hrs.Min.
January	428.30
February	358.15
March	353.10
April	298.10
May	263.20
June	234.45
July	248.30
August	278.00
September	311.25
October	370.05
November	397.40
December	438.35
	3980.25
Deduct on account of 50 min. extinguishing time	30.25
Total, yr.	3950.00

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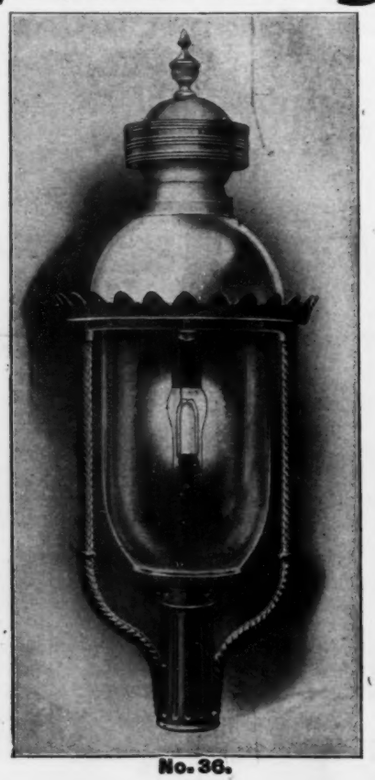

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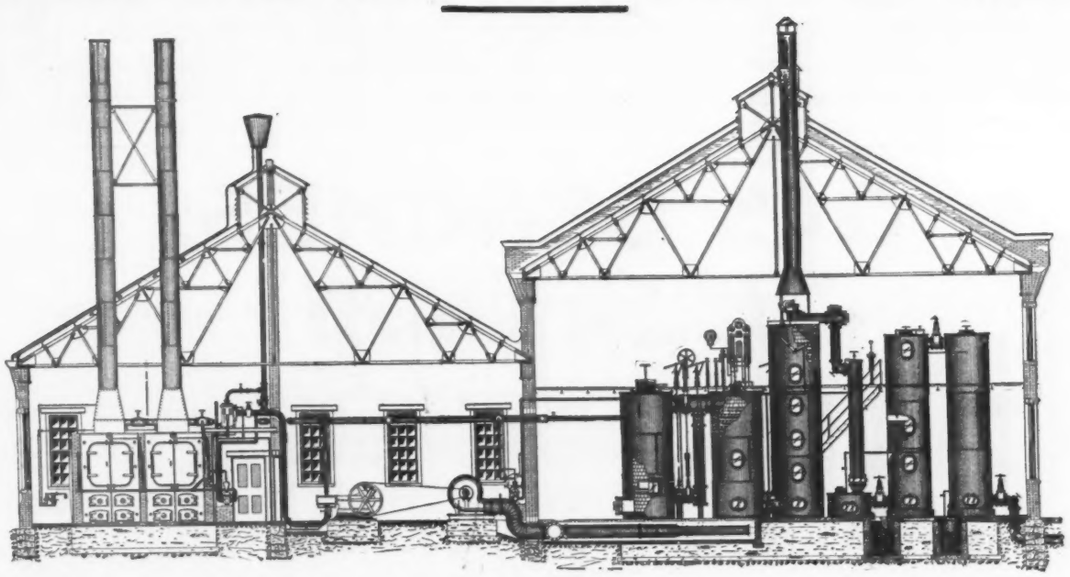

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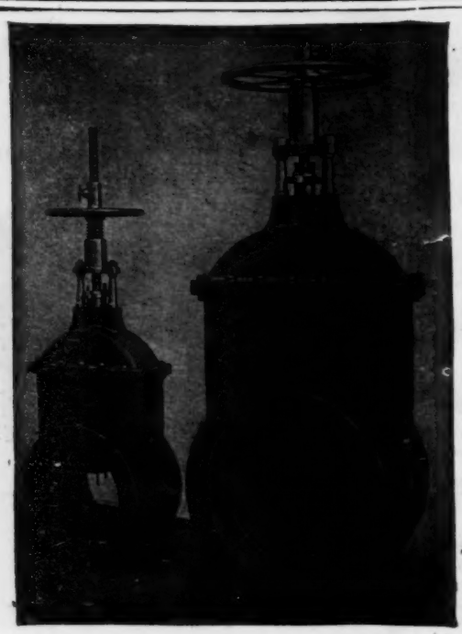

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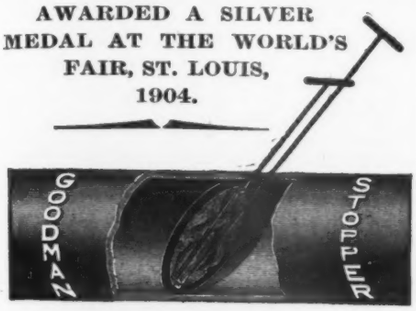

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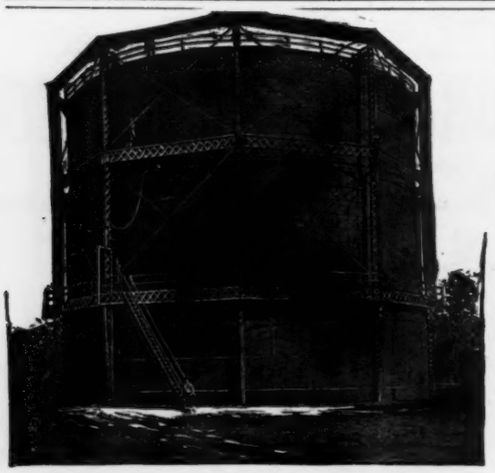

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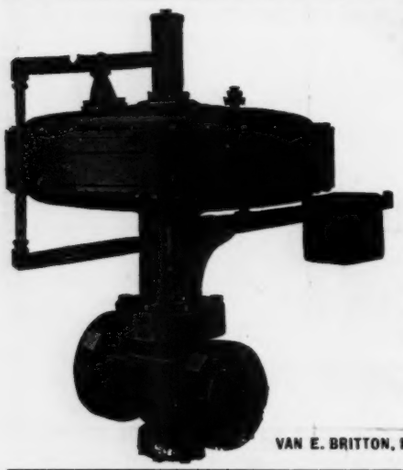

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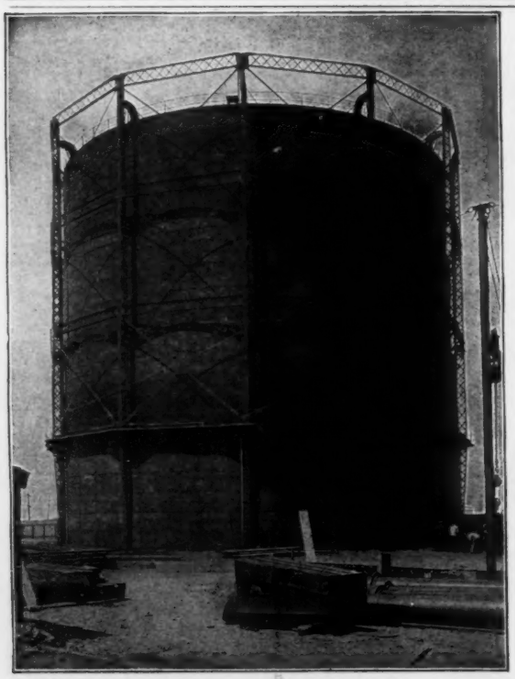

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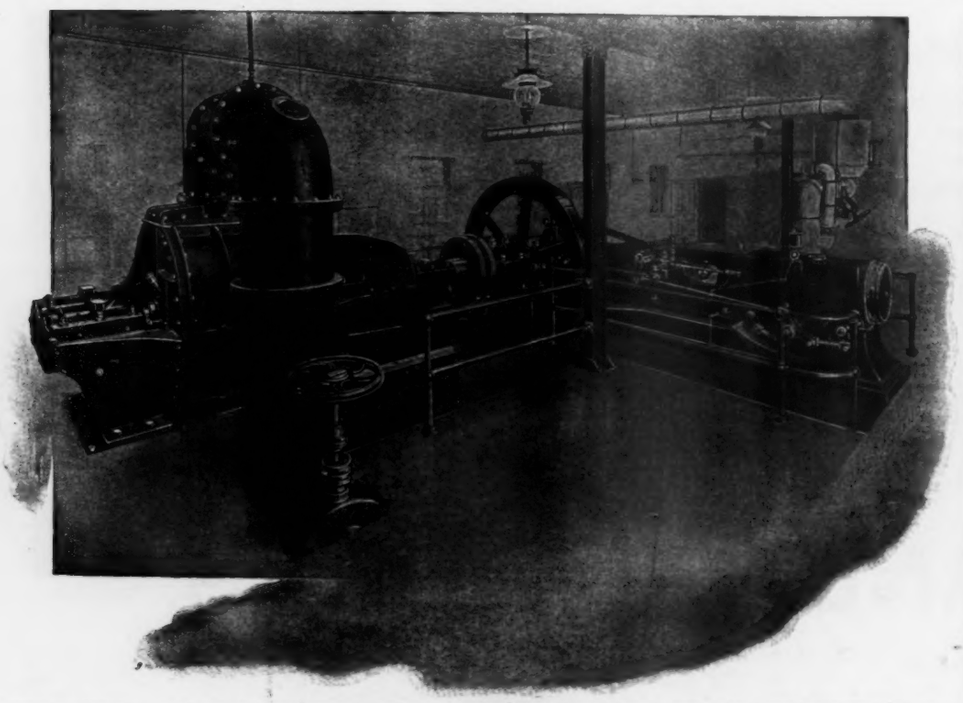

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